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**Observations upon the Cranial Forms of the American Aborigines, based upon
Specimens contained in the Collection of the Academy of Natural
Sciences of Philadelphia.**

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The early record of every science abounds in crude facts, imperfect observations, and, consequently, in generalizations so hastily formed as to partake more of the character of mere speculation than of strictly logical deduction. These erroneous statements and premature generalizations are at first generally accepted as scientific truths. A few cautious observers, it is true, may withhold from them their assent, but their opinions find no support beyond themselves, until these facts and hypotheses come in conflict with others better known and better established, or, are employed in developing still higher and more comprehensive theories. Then, for the first time, they are subjected to a rigid investigation, and their true value, at length, ascertained. Nowhere can we find a more instructive example of this assertion than in the doctrine which ascribes to the American aborigines a homogeneous cranial type. For the philosophical ethnologist this doctrine is full of interest. If the

physical, and more especially the cranial, characteristics of the native races of the New World are at once common and peculiar to them, it is strong, presumptive evidence that they are isolated or distinct from the rest of mankind in origin. If, on the contrary, it can be shown that the skulls of these people really belong to different, well-marked types or forms, which, if not identical with, are, at least, the homiocephalic representatives of those of the Eastern Hemisphere, it becomes very probable that there is for the American variety of man neither unity nor genetic isolation. The discussion of the origin and affiliations of this widely spread race has an important bearing upon the higher and more complex question of the unity of the entire human family. As this discussion involves, among other facts, the consideration of the osteological characters of the aboriginal American, it becomes very important to determine with exactitude the typical, cranial form or forms of this race.

The extraordinary doctrine of a uniform American type of skull originated, as is well known, with the late Dr. Samuel George Morton. He was also the most enthusiastic and persistent advocate of this scientific dogma. A variety of circumstances combined to give unusual acceptance to his views. He began his craniographic researches two years after the completion of Blumenbach's *Decades Craniorum*, by accumulating what was then, as far as I can learn, the largest and most diversified collection of human skulls in the world. These he long and attentively studied, until he acquired the right to speak authoritatively concerning them. No one was in possession of so many native American crania as he, and so little interest was manifested in human craniography at that time, that but few if any persons ever examined his collection with the object of testing the validity of his conclusions. Moreover, prior to the publication of *Crania Americana*, Dr. Morton had already acquired the double reputation of a naturalist and a physician, and for several years before his death occupied the most prominent, official position in the Academy of Natural Sciences. In view of these facts, it is not at all surprising that his opinions, instead of being controverted, as they now are, found ready adherents; and that one of the most eminent of living naturalists should have employed them, as well established facts, in his attempt "to show that the boundaries, within which the different natural combinations of animals are known to be circumscribed upon the surface of our earth, coincide with the natural range of distinct types of man."*

In 1856, while preparing for publication an article on the cranial characteristics of the various races of men† I especially directed my attention to those groups of crania in the Academy's collection which had not been described by Dr. Morton. With regard to American and Egyptian skulls, which he had so long and so carefully studied, I contented myself with reproducing the conclusions which he had already published, my object being to exhibit in general panoramic review the skull-forms of the human family. In the concluding remarks of that article I observed that just as "the Kalmuck or true Mongolian, the Tartar, Chinese, Japanese and Turkish types of skull are all, to a certain extent, related, and yet are all readily distinguishable from each other, and as each of these groups again presents several cranial varieties; so, among the barbarous aborigines of North America, notwithstanding the general osteologic assimilation of their crania, important tribal distinctions can be readily pointed out." I also remarked: "It is a general and very well known fact—first noticed by Buffon—that the fauna and flora of the Old World are not specifically identical with the fauna and flora of the New. Their relationship is manifested in an interesting system of representation, or as Schouw expresses it, of geographical repetition according to climate. To a certain extent, human cranial forms appear also to fall within the limits

* Sketch of the Natural Provinces of the Animal World and their relation to the different Types of Man. By Louis Agassiz. See Types of Mankind, p. lviii.

† Indigenous Races of the Earth, p. 203.

of this system. As far as my own opportunities for examination have gone, I have not been able to find a single aboriginal American type of skull which, in all its essential details, could be regarded as strictly identical with any in Europe, Asia, Africa or Australia." "The massive, heavy skulls of northern temperate Asia and Europe are represented in America by those of the Barbarous tribes—decidedly different, but allied forms. So the comparatively small-headed Peruvians represent the equally small-headed Hindoos."*

In 1859, while attempting to determine the ethnic type of a singularly deformed skull from Jerusalem,† by comparing it with other crania, I noticed, for the first time, how much the form of the occiput differed in the various tribes of Indians. I also observed that "upon our side of the Atlantic the Swedish crania find their representatives in the Arickaree Indian skulls." Subsequently, in another paper, published in the *Proceedings of the Academy*,‡ I endeavored to show that the conformation of the occiput varied as much among the aboriginal American races as among the natives of the Old World. I propose now to demonstrate that this diversity is not confined to the occipital region only, but is exhibited by the skull as a whole. Before, however, interrogating upon this point the magnificent collection which science owes to the untiring industry and sagacity of Dr. Morton, it becomes necessary to inquire for a moment how this eminent craniographer was led to adopt the singular conclusions which he has given to the world in *Crania Americana* and subsequent publications.

It is well known that, with few but important exceptions, the earlier travellers who visited the New World, and certain historians also, speak decidedly of the general resemblance which pervades the aboriginal American tribes. Their uniformity of aspect, customs, &c., led Herrera to assign to them a common origin. "Whoever," said Don Antonio Ulloa, "has seen an Indian of whatever region may say that he has seen them all."|| Bernard Romans was "firmly of the opinion that God created an original man and woman in America of different species from any in other parts of the earth."¶ Robertson declared that all the inhabitants of America, except the Esquimaux, "must be pronounced to be descended from one source."** Malte Brun thought "that the Americans, whatever their origin may be, constitute, in the present day, by their physical characters, not less than by their peculiar idiom, a race essentially different from the rest of mankind."†† In conformity with this view he placed them alone in the last of the sixteen races into which he divided the whole human family. Linnæus,‡‡ Gmelin,§§ Herder,|||| Kant,¶¶ Buffon,*** Hunter,††† Blumenbach,‡‡‡ Lawrence,§§§ Dumeril||||| and other writers, in their attempts at the classification of the races of men, have uni-

* Ibid. pp. 351, 352.

† Description of a Deformed Fragmentary Human Skull, found in an ancient Quarry-Cave at Jerusalem, Proc. Acad. Nat. Sci., Sept., 1859. p. 262.

‡ Observations upon the Form of the Occiput in the various Races of Men, Proc. Acad. Nat. Sci., Sept., 1860, p. 397.

§ Historia de las Indias.

|| "Visto un Indio de qualquier region, se puede decir que se han visto todos en quanto al color y contextura." Noticias Americanas; entretenimientos fisico-historicos sobre la América meridional, y la septentrional oriental, etc. Su Autor el Exc. Sr. Don Antonio de Ulloa. Madrid, 1792, p. 253.

¶ A concise Natural History of East and West Florida. New York, 1776, p. 38.

** History of America. London, 1803, vol. 2, p. 46.

†† Universal Geography. Boston, 1826, vol. v. p. 12.

‡‡ Systema Naturæ, ed. 12 et 13, Homo. English translation by Robt. Kerr, London, 1792, p. 45.

§§ Ibid. p. 46.

|||| Zur Philosophie der Geschichte der Menschheit, II. S. 4, 68.

¶¶ Engel's Philosophie für die Welt, II.

*** Œuvres complètes de Buffon. Paris, 1774, t. v.

†† Disputatio inauguralis quædam de Hominum varietatibus, etc. Edinburgi, 1776, p. 9.

‡‡ De Generis Humani Varietate Nativæ. Göttingæ, 1795, p. 286.

§§ Lectures on Comparative Anatomy, Physiology, Zoology and the Natural History of Man. London, 1848, Bohn's Edition, p. 247.

|||| Zoologie Analytique. Paris, 1806, p. 7.

formly assigned the American family to a separate group or class. Others again, like Zimmerman,* Virey,† Humboldt,‡ Garnot,§ and various authorities of a still more recent date, associate the aboriginal Americans with the Mongols or other Asiatics. It is an interesting fact that Cuvier|| recognized three distinct races of man, into neither of which, however, did he place the Americans, but left them unclassified.

The statements of the earlier investigators—those of the sixteenth and seventeenth centuries—concerning the similarity of physical characters exhibited by the different sections of the American race, harmonize remarkably with the results of the laborious and protracted researches of different eminent philologists. As early as 1798, Dr. Barton endeavored to show "that in all the vast countries of America, there is but one language."¶ In 1810, the celebrated philologue, Vater, to whom had been committed the completion of Adelung's *Mithridates*, or *Allgemeine Sprachenkunde* showed that the general internal or grammatical structure of the American languages was the same for all.** Humboldt, in his *Personal Narrative*, testified to the same remarkable phenomenon.†† Du Ponceau characterized the peculiar, complicated grammar of the American idioms from Greenland to Cape Horn by the term polysynthetic.‡‡ Still later, Gallatin affirmed that all the languages of the native inhabitants of America from the Arctic Ocean to Cape Horn, have, as far as they have been investigated, a distinct character common to all, and apparently differing from any of those of the other continent with which we are most familiar. §§

While these and other observers were thus surveying the American Races from a philological standpoint, the late Dr. Morton was industriously engaged in collecting the materials necessary to illustrate their osteology, and at the same time the distinguished French naturalist, M. Alcide D'Orbigny was travelling in South America and studying the natives, not with the unpractised and superficial eye of the curious traveller, but with that of the closely observant and discriminating anatomist.

The remarkably discrepant ethnological results of the labors of these eminent naturalists were given to the world at the same time. The *Crania Americana* and *L'Homme Américain* both appeared in the year 1839. In the former work, Dr. Morton, speaking of the native Americans, declared that "it may be assumed as a fact that no other race of men maintains such a striking analogy through all its subdivisions, and amidst all its variety of physical circumstances."||| In a later publication he asserted that "the peculiar physiognomy of the Indian is as undeviatingly characteristic as that of the Negro; for whether we see him in the athletic Charib or the stunted Chayma, in the dark Californian or the fair Borroa he is an Indian still, and cannot be mistaken for a being of any other race."¶¶ On the other hand, M. D'Orbigny affirmed, with equal emphasis, that "a Peruvian is more different from a Patagonian, and a Patagonian from a Guarani than is a Greek from an Ethio-

* *Zoologie Geographique*, Cassel, 1784. *L'Homme*.

† *Histoire naturelle du Genre Humain*, Paris, 1824, t. i. p. 480.

‡ *Personal Narrative of Travels to the Equinoctial Regions of America*. London, 1802, vol. i. p. 325.

§ *Dictionnaire d'histoire naturelle*. *L'Homme*.

|| *Le Règne Animal*, p. 103.

¶ *New Views of the Origin of the Tribes and Nations of America*. By Benjamin Smith Barton, M. D., Phila., 1798, p. lxxv.

** *Untersuchung über Amerikas Bevölkerung aus dem alten Continente*. Leipzig, 1810. *Mithridates*, 3 Th. 2 Abth. p. 340. See also Wiseman's *Twelve Lectures on the Connection between Science and Revealed Religion*, London, 1842, p. 80.

†† *Bohn's Edition*, vol. i. p. 313.

‡‡ *Transactions of the American Philosophical Society*. Vol. 1, New Series, 1818, p. xi.; vol. 3, pp. 76, 77.

§§ *Archæologia Americana*, vol. 2, pp. 5, 118.

|| *P. 63*.

¶¶ *An Inquiry into the Distinctive Characteristics of the Aboriginal Race of America*, 2d edit. Philada., 1844, p. 5.

pian or a Mongolian."* This language sounds like the echo of the words of Molina and of Humboldt. "I laugh in my sleeve," said the former, "when I read in certain modern writers, supposed to be diligent observers, that all the Americans have the same appearance, and that when a man has seen one, he may say that he has seen them all." "A Chilian does not differ less in aspect from a Peruvian, than an Italian from a German. I have seen myself Paraguaynos, Cujanos and Magellanos, all of whom have their peculiar lineaments which are easily distinguished from those of the others."† And Humboldt, too, an eye witness like Molina and D'Orbigny, tells us "that those Europeans who have sailed on the great rivers Orinoco and Amazon, and have had occasion to see a great number of tribes assembled under the monastical hierarchy in the missions, must have observed that the American race contains nations whose features differ as essentially from one another, as the numerous varieties of the race of Caucasus, the Circassians, Moors and Persians, differ from one another." "What a difference between the figure, physiognomy, and physical constitution of the tall Charibs, who ought to be accounted one of the most robust nations on the face of the earth, and the squat bodies of the Chayma Indians of the province of Cumana. What a difference of form between the Indians of Tlascala and the Lipans and the Chichimecs of the northern part of Mexico."‡

Blumenbach recorded his conviction that "in the American variety of mankind, as in others, countenances of all sorts occur"§ Both Lawrence|| and Prichard, also distinctly recognized the differences exhibited by the aboriginal Americans.

"Perhaps the degree of resemblance to a common type subsisting between the nations of America," says Prichard, "may admit of comparison with that which is to be traced between the different nations of Europe or among the races of Africa, or those of the northeastern parts of Asia. It is not universally prevalent in the same degree, but there appears to be in every instance some approximation to it; yet there can be no doubt that the resemblance has been in general much exaggerated. It will be easy to prove that the American races, instead of displaying an uniformity of color in all climates, show nearly as great a variety in this respect as the nations of the old continent; that there are among them white races with a florid complexion inhabiting temperate regions, and tribes black or of very dark hue in low and intertropical countries, that their stature, figure and countenances are almost equally diversified." "The nations of South America have in general flatter faces, and many of them a shorter and broader shape of body than the North Americans. In these respects the southern people are more like the Turanian nations than the northern tribes."¶

In another work he remarks: "Anatomists have distinguished what they termed the American form of the human skull; they were led into this mistake by regarding the strongly marked characteristics of some particular tribes as universal. The American nations are spread over a vast space, and live in different climates, and the shape of their heads is different in different parts."***

According to Dr. Barton, a writer named Postel "is said to have been the first who made such a difference between the two Americas, by means of the Isthmus of Panama, that the inhabitants of those two continents have no-

*L'Homme Américain (de l'Amérique Méridionale), considéré sous ses rapports physiologiques et moraux. Paris, 1830 t. i. p. 123.

† Saggio Sulla Storia Naturale del Chili. Bologna, 1810 p. 336.

‡ Political Essay on the Kingdom of New Spain. New York, 1811, vol. i. p. 107.

§ De Generis Humani Varietate Nativa, Edit. Tertia, Gottingæ, 1795, p. 316. See also the Anthropological Treatises of Johann Friedrich Blumenbach, translated by Thos. Bendyshe, London, 1865, p. 273.

|| Op. cit. pp. 221, 223, 224, 247 and 248.

¶ Researches into the Physical History of Mankind, 4th Edit. London, 1841, vol. i. p. 269.

*** The Natural History of Man, 4th Edition, London, 1855, vol. 2, p. 495.

thing common in their origin.'"* The Abbe Clavigero entertained a similar idea.†

Such, in brief terms, were the conflicting statements promulgated by different writers prior to the publication of *Crania Americana*. With all these Dr. Morton was thoroughly conversant. Through Cardan he knew that the skulls of the inhabitants of the old Portus Provincie were square and deficient in the occiput, that Charlevoix described the heads of one of the Indian nations of Canada as globular, and those of another as flat;‡ that De Pauw speaks of certain Indians on the borders of the Maragnon having square or cubical heads.§ and that Malte Brun described the aboriginal Americans as having, among other characters, "heads of a square shape, with the occipital bone not so convex, and the facial line more inclined than among the Mongol race."|| He knew that Humboldt had declared in his *Researches* "that the nations of America, except those which border on the polar circle, form a single race characterized by the formation of the skull," &c.|| He was familiar also with the statements of Von Spix and Martius that the Brazilians resembled the Chinese in possessing, among other physical characters, "a small, not oblong, but roundish, angular, rather pointed head, with a broad crown, prominent sinus frontales, low forehead, and pointed and prominent cheek-bones."*** He was also acquainted with the fact that both Desmoulins and Bory de St. Vincent ascribed to a number of the American races a spherical head as a prominent characteristic. Among the earlier specimens added to his subsequently famous cranial collection, were some brachycephalic skulls, with truncated or more or less vertically flattened occiputs.†† These, together with the numerous short-headed Peruvian crania in his cabinet, presented such a striking contrast with the ordinary elongated head-forms of the human family in general, that he was hastily led to regard the short, round or angular skull with flat occiput and depressed forehead, as the typical cranial form of the aboriginal Americans. This form he probably regarded as the osteological analogue to the holophrastic or polysynthetic character which the philologist had already declared to be at once common and peculiar to the American races.

Dr. Morton divided the American race into two great families—the Toltecan and the Barbarous Tribes. The latter he subdivided into the Appalachian, Brazilian, Patagonian and Fuegian branches. To the Appalachians he ascribed a rounded head; large, salient and aquiline nose; dark brown eyes, with little or no obliquity of position; large and straight mouth; nearly vertical teeth and triangular face. They included all the nations of North America excepting the Mexicans, together with the tribes north of the river Amazon, and east of the Andes. The Brazilian branch, located between the rivers Amazon and La Plata, and between the Andes and the Atlantic, embraced the whole of Brazil and Paraguay north of the 35th degree of south latitude. The Patagonian branch included the nations south of the La Plata to the Straits of Magellan and the mountain tribes of Chili. The Fuegian branch comprised the people who inhabit the island of Terra del Fuego, often called Patagonians. The Esquimaux or Polar Tribes, Dr. Morton separated entirely from the American race, and designated them "Mongol Americans."

With regard to the aboriginal American crania, Dr. Morton tells us that "after examining a great number of skulls, he found that the nations east of

*Charlevoix's Voyage to North America; Preliminary Discourse, p. 3. See Barton's New Views, p. xovi.

†History of Mexico. vol. 2, p. 215.

‡The Anthropological Treatises of Blumenbach, London, 1865, p. 121.

§Recherches philosophiques sur les Américains, Berlin, 1777, t. 1, p. 122.

||Op. cit. pp. 12, 13.

||Researches concerning the Institutions and Monuments of the Ancient Inhabitants of America. London, 1814. Vol. 1, p. 14.

***Reise in Brasilien. München, 1883. 1r Th. S. 184.

††See the 1st Edition of his Catalogue of Skulls.

the Alleghany Mountains, together with the cognate tribes, have the head more elongated than any other Americans. This remark applies especially to the great Lenapé stock, the Iroquois and the Cherokees. To the west of the Mississippi, we again meet with the elongated head in the Mandans, Ricaras, Assinaboins, and some other tribes. Yet even in these instances, the characteristic truncation of the occiput is more or less obvious, while many nations east of the Rocky Mountains have the rounded head so characteristic of the race, as the Osages, Ottoes, Missouris, Dacotas and numerous others. The same conformation is common in Florida; but some of these nations are evidently of the Toltecan family, as both their characters and traditions testify. The head of the Charibs, as well of the Antilles as of Terra Firma, are also naturally rounded; and we trace this character, so far as we have had opportunity for examination, through the nations east of the Andes, the Patagonians and the tribes of Chili. In fact, the flatness of the occipital portion of the cranium will probably be found to characterize a greater or less number of individuals in every existing tribe, from Terra del Fuego to the Canadas."*

At a meeting of the Academy of Natural Sciences held June 1st, 1841, Dr. Morton, in the course of some remarks upon the ancient Peruvians, again speaks of "the squared or spheroidal form as characteristic of the American race and especially of the Peruvians."† At another sitting of the Academy, which took place on the 6th of July in the same year, he made some observations on eight Mexican skulls, and directed attention to the "high vertex, flat occiput, great lateral diameter and broad faces" of these crania as characteristic features of the aboriginal Americans. "Whoever will be at the pains," he said on that occasion, "to compare this series of skulls with those from the barbarous tribes, will, I think, agree that the facts thus derived from organic characters, corroborate the position I have long maintained, that all the American nations, excepting the polar tribes, are of one race and one species, but of two great families, which resemble each other in physical, but differ in intellectual characters."‡

These opinions Dr. Morton continued to reiterate, from time to time, at various meetings of the Academy.§ On the 27th of April, 1842, he read at the Annual Meeting of the Boston Society of Natural History, *An Inquiry into the Distinctive Characteristics of the Aboriginal Race of America*. In this paper he contends still more emphatically for his favorite doctrine of the unity of the American nations. After alluding to the color and stature of these people, he says, "The same conformity of organization is not less obvious in their osteological structure, as seen in the squared or rounded head, the flattened or vertical occiput, the high cheek bones, the ponderous maxillæ, the large quadrangular orbits, and the low, receding forehead. I have had opportunity to compare nearly four hundred crania derived from tribes inhabiting almost every region of both Americas, and have been astonished to find how the preceding characters, in greater or less degree, pervade them all. This remark is equally applicable to the ancient and modern nations of our continent; for the oldest skulls from the Peruvian cemeteries, the tombs of Mexico and the mounds of our own country, are of the same type as the heads of the most savage existing tribes. Their physical organization proves the origin of one to have been equally the origin of all."

In this paper Dr. Morton objects to the observations of Molina and Humboldt, above referred to, in disproof of this pervading uniformity of physical characters, by saying that the different people mentioned by these writers are really of one and the same race, and readily recognized as such, notwithstanding

*Crania Americana, pp. 64, 65.

†Proc. Acad. Nat. Sci., vol. 1, p. 36.

‡Ibid 1, p. 52.

§See Proc. Acad. Nat. Sci., vol. 1, pp. 126, 203; vol. 3, pp. 212, 213.

ing their differences of feature and complexion; and the American nations, he thinks, present a precisely parallel case. But this objection, which is far from being a valid one, can by no possibility be urged against the analogous remarks of M. D'Orbigny.

In 1846, Dr. Morton contributed to the *American Journal of Sciences*,* *Some Observations on the Ethnography and Archaeology of the American Aborigines*, in which he "averts that sixteen years of almost daily comparisons have only confirmed him in the conclusions announced in his *Crania Americana*, that all the American nations, excepting the Esquimaux, are of one race, and that this race is peculiar and distinct from all others. The first of these propositions may be regarded as an axiom in Ethnography; the second still gives rise to a diversity of opinions, of which the most prevalent is that which would merge the American race in the Mongolian."

In the same year he published *An account of his Craniological Collection; with remarks on the Classification of some Families of the Human Race*, in the form of a letter, addressed to Mr. John R. Bartlett, Secretary of the American Ethnological Society.† In this letter he thus writes:

"The anatomical facts, considered in conjunction with every other species of evidence to which I have had access, lead me to regard all the American nations, excepting the Esquimaux, as people of one great race or group. From Cape Horn to Canada, from ocean to ocean, they present a common type of physical organization, and a not less remarkable similarity of moral and mental endowments which appear to isolate them from the rest of mankind; and we have yet to discover the unequivocal links that connect them with the people of the old world."

Dr. Morton's last contribution to craniographical science,‡ which was published after his death, shows conclusively that his views respecting the homogeneity of the aboriginal American races had undergone no change whatever. In this paper he still maintains the doctrine of a uniform, cranial type for these races, with the same arguments and in language almost identical with that which he employed in his *Inquiry* ten years before.

I make these references to his published opinions to show that Dr. Morton perseveringly inculcated this doctrine from the inception to the very close of his ethnological studies, comprising a period of about twenty-one years; that he was thoroughly convinced of its truthfulness, and regarded it as one of the best established and most readily demonstrable of all the conclusions at which he had arrived after a long and unwearied study of his cranial collection.

It is a remarkable fact, however, that opinions diametrically opposed to these were maintained by two French ethnologists, with whose writings Dr. Morton was familiar, and whose classifications he criticises adversely in *Crania Americana*.§ I allude to Dr. Desmoulins and M. Bory de St. Vincent.

As far back as 1826 Desmoulins divided the aboriginal Americans into two species,—the Columbians and the Americans. To the first he assigned as their chief specific character an "elongated head," and to the second "a generally spherical head." The Columbians occupied the whole of North America, all the table lands and declivities of the Cordilleras, from Chili to Cumana, and also the Caribbean archipelago. The Americans comprised the Omaguas, Gauranis, Coroados, Puris, Atures, Ottomacs, Botocudos, Guaiacas, Mbayas, Charruas, Puelches, and Tehullets or Patagonians. "There is no doubt," says Desmoulins, "that the Columbians, and still more the Americans, are each again divisible into several species, as different from each other as those of Africa.¶

* Vol. II. Second Series.

† Transactions of the American Ethnological Society, vol. 2, p. 217.

‡ Physical Type of the American Indians, in Schoolcraft's Information respecting the History, Condition and Prospects of the Indian Tribes of the United States. Part 2, p. 315.

§ Pp. 63, 84, 85.

¶ Tableau Général, physique et géographique des Espèces et des Races du Genre Humain, contained in Histoire Naturelle des Races Humaines du Nord-est de l'Europe, etc. Paris, 1826.

Bory de St. Vincent divided the Americans into four species,—the Neptunian, Columbian, American and Patagonian. Of the Columbians he says: "Lear tête est bien confrmée, il en résulte une figure agréablement ovale, où le front est cependant singulièrement aplati;" and of the Americans: "Les hommes ont, à peu d'exception près, la tête ronde, d'un volume disproportionné, enfoncée dans les épaules, lourde, aplatie sur le vertex," &c.*

In 1839, M. D'Orbigny, speaking of the native races of South America, declared that, after examining a large number of crania, he was convinced that they differed from each other not only according to race and nation, but also individually; and that it would be as difficult to prove that the form of the head is one among the Americans, as to demonstrate rigorously the permanent cranial characters, which would be sufficient to distinguish them from other nations.†

The late Prof. Retzius communicated to the meeting of the Scandinavian Association of Naturalists, held at Stockholm, in 1842, a valuable paper on the *Form of the Skulls of Northerns*, in which he refers the Greenlanders and some of the American races to the prognathic Dolichocephali, and others of the American family to the prognathic Brachycephali.‡ Two years later he read before the same Association, at a meeting held in Christiania, in July, 1844, another essay *On the Form of the Skull in different Nations*,§ in which he devotes a special section to the American races, and classifies them in the following manner, according to the length of the cranium:

G. dolichocephalæ prognathæ.	{ Northern Americans.	{ Greenlanders and Esquimaux, Kolusches, Cherokees, Chippeways, Iroquois, Hurons, Chickasaws, Cayugas, Ottigamies, Pottawotomies, Lenni Lenapé, Blackfeet.
		{ Botocudos, Caribs, Guaranis, Aymaras, Huanchas, Patagonians.
G. brachycephalæ prognathæ.	{ Northern Americans,	{ Natches, Creeks, Seminoles, Euches, Klatskanai.
		{ Charruas, Puelches, Araucanians, Modern Peruvians.

* L'Homme (Homme). Essai Zoologique sur le Genre Humain; 2d edit, Paris, 1827, t. 2, pp. 6, 21.

† L'Homme Américain. t. i. pp. 118, 119, 120.

‡ Om Formen af Nordboernes Cranier, af A. Retzius. (Afttrykt ur Förhandl. vid Naturforskarnes Møte i Stockholm, år 1842.) Stockholm. 1843, p. 4. See also: "Über die Schädelformen der Nordbewohner," in J. Müller's Archiv, for 1846.

§ Om formen af hufvudet hos olika folkslag. Ved Prof. A. A. Retzius, M. D. (Afttrykt fra "Forhandlinger ved de Skandinaviske Naturforskeres fjerde møde i Christiania fra 11—18 Juli, 1844.") Christiania, 1847, pp. 17, 18. See also the German translation, Ueber die Form des Knochengestütes des Kopfes bei den verschiedenen Völkern, pp. 280, 281.

G. brachycephalæ
orthognathæ.

{	Northern Americans.	{ Aztecs in Mexico?
	Southern Americans.	{ Chincas in Peru?

The latest and best elaborated views of Prof. Retzius upon this subject are contained in a valuable essay, entitled *A Glance at the present state of Ethnology, with reference to the Form of the Skull*.^{*} This paper was read at the seventh meeting of the Scandinavian Association of Naturalists, held at Christiania in 1856. In it, the author thus criticises the theory of American unity, so long and so persistently supported by Dr. Morton:

"No European philosopher has," says Prof. Retzius, "since the time of Blumenbach, devoted such fertile labor to the subject of ethnological craniology as Dr. Morton, of Philadelphia, in his '*Crania Americana*;' the results of which are, nevertheless, but little satisfactory. Morton, himself, who has brought forward so many facts of high value, has, like the distinguished linguist who with such indefatigable labor studied the American tongues, come mainly to the conclusion that both the race and the language are one. I am rather perplexed as to this result, for I must confess that, from the facts brought forward by Morton, and the numerous skulls with which he has so kindly enriched the collections in Stockholm, I have arrived at a wholly different inference. I can explain this only by supposing that this distinguished man has allowed his extensive philology and great learning to affect his vision as a naturalist. If the form of the skull is to have any weight in the question of the races of man, there is scarcely any part of the world where such contrasts are to be found between dolichocephali and brachycephali as in America, and as such they present themselves to the eye of the naturalist in Morton's '*Crania Americana*.' I may just refer, for proof of this, to plate 2, '*Peruvian child from Atacama*;' plate 32, '*Lenni Lenape*;' plate 38, '*Pawnee*;' plate 40, '*Cotonay, Blackfoot*;' plate 64, '*Carib of Venezuela*;' plate 65, '*Carib of St. Vincent*'—all of the most marked dolichocephalic forms; and, on the other hand, to plates 30 and 31, '*Natches*,' with the great majority of the figures of skulls from Chili, Peru, Mexico and Oregon, with many others of equally well marked brachycephalic form. Much as these plates bear the same testimony, I should scarcely have ventured on such a remark, did not a very rich series in our own collections, as well as several valuable drawings by Blumenbach, Sandifort, Van der Hoeven, &c., support my opinion.

"From what I can infer from the American skulls I have seen, whether in nature or in casts or plates, I have come to the conclusion that the dolichocephalic is the predominant form in the Carribbee Islands, and in the eastern region of the great American continent, from its most northern limit down to Paraguay and Uruguay; and the brachycephalic in the Kurile Islands and on the continent, from Behring's Strait, in Russian America, Oregon, Mexico, Ecuador in Peru, Bolivia, Chili, Argentina, Patagonia, and Terra del Fuego.

"Morton has also drawings of four Esquimaux skulls, from the most northern parts of America, and from the island of Disco, off the coast of Greenland; all of the characteristic form. In the text he says that they are always characteristic, and that they are most decidedly distinguished from the skulls of the American Indians; but adds at the same time, singularly enough, that these Esquimaux are the only Americans presenting the Asiatic characters. It is evident that this distinguished man has been guided by his already es-

^{*} Blick auf den gegenwärtigen Standpunkt der Ethnologie in Bezug auf die Gestalt des menschlichen Schädelgerüsts. Von Andreas Retzius, Berlin, 1857. See also J. Müller's Archiv für Anatomie und Physiologie, 1858; and for an English translation see British and Foreign Medical-Chirurgical Review for April and July, 1860. This translation was executed by Dr. W. D. Moore, who informs us that in the last letter which he received from Prof. Retzius, the latter says: "You give me also hope to see my ethnological views in English; I should be very thankful for that, as you see that it contains some views of, as I think, great importance; as in the question of the unity of the American races, which I have clearly shown false." This letter appears to have been written not long before the death of this eminent Swedish cranio-grapher.

established views, rather than by the strict investigation of facts. He saw in the formation of the face of the Esquimaux, something Mongolian, that is, Asiatic; but he overlooked the prominent occiputs, as well as other characters which are not Mongolian. In like manner he, as it were, forgot the beautiful figures given by himself, in his splendid work of dolichocephalic American Indians; of which some in particular, as Cotonay (Blackfoot), Cherokee, Chippeway, and, above all, Cayuga (Pl. 35), approach the form of the Esquimaux skull, with their large alveolar processes and projecting occiputs."*

Prof. Retzius refers the aboriginal inhabitants of America to three distinct sources. As certain Chinese skulls in the museum of the Carolinian Institute resemble Tungusian and Greenland crania, he traces the pedigree of the Esquimaux into Asia, among the Chinese population, the transitional link being the Aleutians. The dolichocephalic Indians he assumes to be related to the Guanches of the Canary Islands, and the Atlantic tribes in Africa, as the Moors, Berbers, Tuaricks, Copts, &c., which are comprised under the Amazigh and Egyptian Atlantidæ of Latham. The American brachycephalic tribes, which belong chiefly to the side of America looking towards Asia, the Pacific Ocean, and the South Sea, are allied, he thinks, to the Mongolian nations.†

D'Omalius d'Hallo, in 1845, divided the American Indians into a northern branch, characterized with "elongated heads," and a southern branch, having "the head ordinarily less elongated."‡

In 1846 Dr. Zeune, from a careful examination of the skulls in the anatomical collection at Berlin, adopted three main cranial forms or types for the western hemisphere. He remarks that, although Blumenbach and Prichard grouped the races of the New World together as one, he found greater and more marked differences among their skulls, than among those of the Old World.§

In 1850 Dr. Latham endeavored to show, by means of a comparative table constructed from Dr. Morton's own measurements, that the general ascription of the brachycephalic form to the American Indians was an error; and that, on the contrary, they were more frequently dolichocephalic.||

In the same year Dr. Knox also expressed a doubt as to the "asserted identity of the Red Indian throughout the entire range of continental America."¶

In 1848, Col. Chas. Hamilton Smith declared that "it is vain to assert that all American Races, excepting the Esquimaux, have originally sprung from one stock."***

In the years 1855 and 1856, we find three other ethnologists, in widely separated localities, expressing their doubts, each from his own independent observations, as to the validity of Dr. Morton's long cherished views.

"The inspection of the Mexican skulls represented in *Crania Americana*," says Dr. Gosse, "seems to prove that in these the depression of the occiput was far from being as general and as marked as among the Incas and the crania examined by Meyen; for in many of them the head is rather normally developed behind."††

Dr. J. B. Davis also writes that though "this position of Morton's is no

* Op. cit., pp. 23, 24, 29.

† Op. cit., pp. 30 and 32. See also *Ofvers. Aft. Vet. Akad., förh. 1855, No. 1, pp. 5 and 6.*

‡ *Des Races Humaines.* Paris, 1845, pp. 169, 167.

§ *Über Schädelbildung zur festern Begründung der Menschenrassen.* Von Prof. Dr. August Zeune, Berlin, 1846, p. 13.

|| *The Natural History of the Varieties of Man.* London, 1850, p. 453.

¶ *The Races of Men*, 2d edit., Lond., 1862, pp. 127, 255, 256, 275.

** *The Natural History of the Human Species.* Lond., 1859, pp. 251, 253.

†† *Essai sur le Déformations Artificielles du Crâne.* Paris, 1855, pp. 72, 74.

doubt founded in truth, yet it must be allowed to be liable to numerous exceptions."^{*}

In November, 1856, Prof. Wilson, of Canada, who, for some time before, had been especially directing his attention to the conformation of the American Indian cranium, published an account of the discovery of some Indian remains in Canada West.[†] "No indications," he wrote on that occasion, "have yet been noticed of a race in Canada corresponding to the brachycephalic or square-headed mound-builders of the Mississippi, although such an approximation to that type undoubtedly prevails throughout this continent as, to a considerable extent, to bear out the conclusions of Dr. Morton, that a conformity of organization is obvious in the osteological structure of the whole American population, extending from the southern Fuegians, to the Indians skirting the Arctic Esquimaux. But such an approximation,—and it is unquestionably no more,—still leaves open many important questions relative to the area and race of the ancient mound builders. On our northern shores of the great chain of lakes, crania of the more recent brachycephalic type have unquestionably been repeatedly found in comparatively modern native graves. Such, however, are the exceptions, and not the rule. The prevailing type, so far as my present experience extends, presents a very marked predominance of the longitudinal over the parietal and vertical diameter; while, even in the exceptional cases, the brachycephalic characteristics fall far short of those so markedly distinguishing the ancient crania, the distinctive features of which some observers have affirmed them to exhibit."

In August, 1857, Dr. Wilson read before the meeting of the American Association for the Advancement of Science, a valuable and interesting paper on the *Supposed prevalence of one Cranial Type throughout the American Aborigines*.[‡] In this article, the mere doubt expressed a year before now becomes a positive conviction, that native American crania do not belong to one type, but are referrible to dolichocephalic and brachycephalic forms; "and that a marked difference distinguishes the northern tribes, now, or formerly occupying the Canadian area, in their cranial conformation, from that which pertains to the aborigines of Central America and the southern valley of the Mississippi; and that in so far as the northern differ from the southern tribes, they approximate more or less, in the points of divergence, to the characteristics of the Esquimaux." In the second edition of *Prehistoric Man*, published eight years later, he concludes that "the results of his attempts at a comparative analysis of the cranial characteristics of the American races show that the form of the human skull is just as little constant among different tribes or races of the New World as of the Old; and that so far from any simple subdivision into two or three groups sufficing for American craniology, there are abundant traces of a tendency of development into the extremes of brachycephalic and dolichocephalic forms, and again of the intermediate gradation by which the one passes into the other."[§]

It will thus be seen that Desmoulins, Bory de St. Vincent, Alcide d'Orbigny, Retzius, D'Omalius d'Halloy, Latham, and, more recently, Wilson, have all expressed their conviction, in terms more or less emphatic, that the American races are divisible, according to the form of the skull, into dolichocephalic and brachycephalic groups. Retzius and Zeune have gone a step further, by referring the crania of these races to three distinct forms or types. According to Zeune, these crania are divisible into long, broad, and high forms, corres-

* *Crania Britannica*, Decade 3, p. 10.

† *Canadian Journal of Industry, Science and Art*, Nov., 1856, p.

‡ *The Canadian Journal*, Nov., 1857. See also *Edin. Philosoph. Journal*, N. S., vol. vii. This paper, enlarged and somewhat altered, constitutes chap. 21 of the first edition, and chap. 20 of the second edition of *Dr. Wilson's Prehistoric Man*; and Part I of *Lectures on Physical Ethnology*, contributed by the same author to the *Smithsonian Report* for 1862.

§ Page 483.

pondering to three similar types in the Old World; and according to Retzius, into Asiatic dolichocephalic, (Chinese,) Mongolian, and Semitic forms. Zeune, in his comparative table, has indiscriminately grouped together normal and artificially deformed skulls. His classification has, consequently, no ethnologic value. To Prof. Retzius is due the credit, as far as I can learn, and as appears from the above chronological reference to the literature of this subject,—of being the first to perceive the true ethnological import of the data set forth in *Crania Americana*. From 1842 to 1860, the year of his death, he as positively opposed the doctrine of aboriginal American unity as Dr. Morton zealously supported it. Dr. Wilson has indisputably confirmed the views of Retzius as to the division of the American tribes into long and short heads, and their consequent cranial non-unity, by means of a valuable series of comparative tables of measurements, accompanied with important critical observations, showing very considerable, judicious, and even enthusiastic research.* Like Humboldt and Pickering, he favors the Mongolian classification of the American Indian, and thinks that this classification is "borne out by many significant points of resemblance in form, color, texture of hair, and peculiar customs and traits of character."†

From a careful examination of the Morton Collection, I am convinced that the division of aboriginal American crania into dolichocephalic and brachycephalic groups merely, is wholly inadequate to exhibit thoroughly the ethnic differences which dispart them, in some instances, quite widely. It is easy to point out crania which are comparatively shorter than most of the so-called long skulls; and others again, which are longer than the so-called short-heads. Such deviations fall naturally into an intermediate or mesocephalic group, which differs from the two extreme classes not in length only, but in other characters also. Moreover, the ethnic value of dolichocephalism and brachycephalism, or of length as compared with height and breadth, is by no means fully determined. This character is not always of primary importance. On the contrary, it is frequently of secondary value in classification. Two or more skulls may be equally dolichocephalic, and yet belong to different types or forms. Compare, for example, the cranium of the typical woolly-haired negro represented on page 325 of *Indigenous Races*, with the skull of an ancient Roman, or of a Circassian, figured on pages 312 and 316, respectively, of the same work. These are all dolichocephalic; but the slightest inspection shows that they belong to very different types, and that the typical or differential characters are located in the facial bones chiefly. In like manner, if we compare together the Ottawa and Mound skulls Nos. 1007 and 1512, which are both brachycephalic, we readily perceive that the one belongs to the spherical or globular form, and the other to the square-headed or cubical type. In order to establish indisputably the cranial diversity of the American races, it is obviously necessary, in view of the above facts, not only to point out

* In his paper, read before the American Association in 1857,—a year after Retzius had publicly announced his matured views upon American crania to the Scandinavian Association, and through it to the scientific world generally—Dr. Wilson says: "Scarcely any point in relation to ethnographic types is more generally accepted as a recognized postulate than the approximate homogeneous cranial characteristics of the whole American race." "The stronghold of the argument for the essential oneness of the whole tribes and nations of the American continents, is the supposed uniformity of physiological, and especially of physiognomical and cranial characteristics: an ethnical postulate which has not yet, so far as I am aware, been called into question." (*Canadian Journal*, Nov., 1857, pp. 409, 416.) When these lines were written, Dr. Wilson appears not to have been acquainted with the labors of Retzius in this field; he certainly makes no allusion to them whatever. These statements are reproduced in 1862, in the first edition of his "Prehistoric Man," (pp. 205, 212) and again in 1866, in the second edition of this deeply interesting work, (pp. 425, 430, 431.) In both these editions he alludes to Retzius simply as amongst those who have recorded conclusions similar to his own. He refers the reader, for the views of Retzius, to the "Archives des Sciences Naturelles," published at Geneva in 1860, and, in his "Lectures on Physical Ethnology," in the Smithsonian Report for 1862, p. 244, accompanies this reference with the statement that his own views on this subject were first published by him at the meeting of the American Association in 1857.

† *Prehistoric Man*, 2d edit., p. 473.

among these races the prevalence of both dolichocephalic and brachycephalic forms, but also to demonstrate the existence of different well-marked types into which they may be grouped, and which can be shown to be as different from each other as any of the distinct forms indigenous to the Old World. This I have attempted to do in the ensuing pages, carefully abstaining, however, for the present, from the expression of any opinion concerning the allied but entirely distinct question of the origin and affiliations of these races. As this question, in its osteological aspects, is intimately connected with the consideration of the cranial characters of the Esquimaux race, I propose, instead of discussing it at present, to return to it in a future monograph upon the skulls of the Polar people.

The Human Cranial Collection of the Academy of Natural Sciences of Philadelphia, contains at the present time 575 skulls of the Aborigines of Northern, Central and South America.

The Esquimaux Family is represented by thirteen specimens from Baffin's Bay, Storöf, Cape Alexander, Upernavick and Godhavn. Dr. I. I. Hays, on his return from the Arctic regions in 1861, brought with him 125 skulls of this race. This large and very important collection he kindly placed in my care for study and description, with the request that I should select therefrom and present to the Academy, as his donations, those specimens which appeared to constitute the most suitable additions to the Museum.* Through these additions the Esquimaux race, though occupying a region so remote and inaccessible, will be more numerously represented in the collection, than any of the North American Indian tribes.

Of the great Athapascan or Chippewyan Family, lying to the south of the Esquimaux area, and extending from Hudson's Bay westwardly towards the Pacific Ocean, there is but one specimen in the Museum of the Academy. This skull, No. 577 of my *Catalogue of Human Crania*, belongs, moreover, to none of the tribes living in juxtaposition within the continuous area of the Athapascans, but to a small detached band, called Tlatskanai or Klatskanai,† living in the mountains south of the Columbia River, near the sea-coast. This tribe, now nearly, if not quite extinct, belongs to the "Tahkali-Umkwa Family" of Hale,‡ which is synonymous with the "Southern Athabaskans" of Latham.§ It is thus classified on account of its philological affinities, which are Athapascan.

It is obviously impossible to determine the craniological relations of the Tlatskanai, and through these of the Athapascans generally, by means of the single cranium just referred to. This skull is artificially distorted or compressed like the Chinook crania. The longitudinal and bi-parietal diameters are nearly equal. Art has, therefore, rendered it brachycephalic. The upper alveolus is quadrangular in form.

To enumerate the various tribes of Athapascans of which cranial specimens are wanting in the collection, would be to go over the entire list of these tribes as now known. In view of the geographical position of this group, this is much to be regretted. The Koluschians and Athapascans on the west of Hudson's Bay and the Algonquins on the east are the only Indians coterminous with the Esquimaux. The Athapascan area borders upon the Esquimaux region over a much greater extent of surface than that of either the Koluschians or Algonquins. Among the Athapascans, the Coppermine, Dog-Rib and Hare or Slave Indians come in contact with the Esquimaux as far north as the Arctic circle. As they are thus exposed to the same climatic conditions it becomes very important to compare the crania of these tribes with those of their paraborian neighbors. The same remark applies to the northernmost of the Ko-

* See Proceedings of the Acad. Nat. Sci., 1862, p. 601.

† Called Klatskanai by Morton, who figures and gives measurements of this skull in *Crania Americana*, plate 44, p. 210.

‡ Transactions of the American Ethnological Society, vol. 2, p. 9.

§ The Natural History of the Varieties of Man, p. 308.

lusichian and Algonquin tribes. Unfortunately for the purpose of such comparison no specimens of the skulls of these tribes are in the possession of the Academy. In other words the collection is deficient in skulls of the Kenai of Cook's Inlet, the Atnahs of Copper River, the Ugalents or Ugalyakhmutzi, of King William's Sound, &c., among the Kolutchians; and in the Knistinaux or Crees, and the various other tribes of Algonquins who formerly occupied the country between Labrador and the New England States.

The Indians of the north-west coast are represented in the collection by 22 specimens, obtained from various localities in British Columbia, Washington Territory, and the State of Oregon. Three of the skulls of this series, a Teimse-ann or Chimseyan and two Nas-kahs or Naaskoks (Nos. 987, 213 and 214 of the *Catalogue*), belong to the Naas family of Hale, and are from the Naas River and the region of country about Fort Simpson, in lat. 54° 40' N. Consequently of all the Pacific coast crania in the collection they are the most northern. The Chimseyan skull is a long, low head with a moderately full and rounded occiput. The coronal region is flat and triangular, narrow at the forehead between the external angular processes, from which it widens out to a great interparietal diameter, the parietal protuberances being very prominent. Both the Naas crania are long, oval heads with full and prominent occiputs. In No. 213 the occipital protuberance is prolonged into a sharp mammillated process. The next six in geographical order, (Nos. 208, 944, 946, 1013, 1014 and 1015), are from Puget's Sound. No. 208 is the skull of a Skwale or Nisqually "Medicine Man." It is artificially flattened. The other five are flattened heads, obtained by my friend Dr. Thos. J. Turner, of the U. S. Navy. They probably belong, with one exception, to the Suquamish tribe. These six crania together with a Kowalitsk skull, (No. 573) from Washington Territory, and a Tilamook, Killamook or Killamuck cranium (No. 576) from the State of Oregon, belong to the Tshihaili-Selish Family of Hales, the Tshihaili of Latham. The next two crania of this group are Klikatats (Nos. 207* and 461) from Washington Territory. They belong to the Sahaptin Family of Hale and Gallatin. Of the Calapooya or Kalapuya tribe of the Willamette Valley, Oregon, there is one cranial specimen, No. 574. There are nine Chinook crania in the collection. Of these Nos. 462, 641, 721, 1349 and 1350 are Chinooks proper. Nos. 203 and 575 are Clatsops or Klatatsops, a band of the lower division of Chinooks, occupying the sandy plain at Point Adams, to the south of the mouth of Columbia River. Nos. 457 and 578 should, in all probability, be rejected from this series. As they are not flattened nor distorted in any manner, but retain the natural form, they are very likely slaves, and as such belong to some other tribes. All the free Chinooks flatten their heads, and so highly do they value this deformity as a mark of distinction that they do not allow their slaves to practise it.

Upon this point most of the travellers who have visited the tribes of Columbia River agree. In other respects, however, their testimony is very discrepant. Mr. Townsend, in a letter to Dr. Morton, affirms that he "has occasionally seen both Chinooks and Chickitats with round or ordinary shaped heads, sickness having prevented the usual distortion while young."† This statement has evidently led Dr. Morton to regard No. 578 as a true Chinook skull which has not been subjected to the flattening process. "This head," says Dr. M., "differs in nothing from that of the Indians in general, from one end of the continent to the other; but it is gratifying to be able to present a perfectly natural skull of people among whom a round or naturally formed head is considered a degradation."‡ Dr. Pickering assures us that as the children, whose heads have been compressed, "grow up, the cranium tends to resume its

* Nos. 203, 207, 208, 213 and 214 were obtained by Mr. Geo. Gibbs, who informs me that No. 207 is a hybrid being half Klikatats, half Nisqually.

† *Crania Americana*, p. 207.

‡ *Ibid.*, p. 208.

natural shape, so that the majority of grown persons hardly manifest the existence of the practice. One effect, however, seemed to be permanently distinguishable, in the unusual breadth of face."* Mr. Hale also says: "In after years the skull, as it increases, returns in some degree to its natural shape, and the deformity, though always sufficiently remarkable, is less shocking than at first."† Dr. Pickering declares "that slaves may in general be distinguished by the head not being flattened, though they are careful to perform this process on their children."‡ Mr. Hale, on the contrary, states that "the children of slaves are not considered of sufficient importance to undergo this operation, and their heads, therefore, retain their natural form." Mr. George Gibbs, who dwelt for several years among the coast tribes in the capacity of Indian agent, likewise declares that "the children of slaves are not allowed to flatten the skull."§ In another place he says, "among some of the Pacific tribes, compression of the head is confined to females, or is, at any rate, only carried to any considerable extent among them. Slaves are sometimes of the same tribe with their owners, but they are more frequently purchased from others; and it should be noted that on the Pacific the course of the trade has been from south to north."|| This gentleman, in an interesting letter to the writer, dated July 8th, 1859, suggests that "as slaves very rarely if ever spring from the tribes in which they are held, and as the course of the slave trade is almost always from the south to the north," the two skulls above referred to, Nos. 457 and 578 most probably come from southern Oregon or California. The Klamath and Shaste tribes of California, he thinks, furnish many slaves to the region about Fort Vancouver, while captives from this region are taken still further northward from Puget's Sound as far north even as the Russian possessions. In opposition to these statements of Mr. Gibbs, we are informed by Mr. Townsend that among the Chinooks those individuals whose skulls were not flattened during infancy, on account of sickness, "never attain to any influence, nor rise to any dignity in their tribe, and are not unfrequently sold as slaves." Mr. Jas. G. Swan, in his account of the coast tribes between the Straits of Fuca and the Columbia River, says, "their slaves are purchased from the northern Indians, and are either stolen or captives of war, and were regularly brought down and sold to the southern tribes."¶ My friend Dr. Thos. J. Turner, U. S. N., who spent some time at Puget's Sound, in 1856, and whom I therefore interrogated upon this subject, informs me that there is a marked distinction between the Indian tribes on Vancouver's Island and to the north of the Straits of Fuca, and those on the southern side. The northern tribes known as Stikanes, or Cowitchins, are taller, more war-like, and of a lighter color than the southern Indians, and what is very remarkable, have been seen by him to blush.** Instead of compressing their heads into a disc-like shape, as the Chinooks do, they give to them, by means of bandages, a conical or sugar-loaf form. Further north this custom is discontinued by the men, and is confined altogether to females. Dr. Turner also informs me that unaltered heads, found among tribes addicted to this practice to a great degree, may safely be assumed to be those of slaves, and are probably of foreign origin, either directly or ancestrally. The direction of the slave trade is northward. On this account the southern tribes are always in fear of their more aggressive northern neighbors. As the

*The Races of Man; and their Geographical Distribution. By Charles Pickering, M. D., London, 1851, p. 19.

†Transactions of the American Ethnological Society, vol. 2, p. 16.

‡Op. cit. p. 20.

§Indigenous Races of the Earth. p. 336.

¶Instructions for research relative to the Ethnology and Philology of America. Prepared for the Smithsonian Institution, by George Gibbs, Washington, 1863. p. 3.

¶The North West Coast; or Three Years residence in Washington Territory. By Jas. G. Swan, New York, 1857, p. 166.

**According to Von Spix and Martius, "the Indians, properly speaking, cannot blush, and the *Erubescit, salva res est,* cannot be applied to this unpolished race." See Prichard's Researches, vol. 1, p. 271.

flattened head in all its varieties is considered a mark of distinction among these people, they are very loth to abandon it. In several instances, where the "papooses" came under medical treatment, efforts were made to induce the mothers to discontinue the practice, but without avail.

These conflicting statements show how difficult it is to determine satisfactorily whether Nos. 457 and 578 are Chinooks or not. The latter somewhat resembles the Naas skull, No. 214, but is comparatively shorter and broader. The former is more like the Chimseyan. If they are really Chinooks, it shows that these people are naturally dolichocephalic. Judging from the deformed specimens, I should suppose the heads of the Chinooks were naturally short or brachycephalic. The unflattened Chinook, No. 578, is a rather short, broad oval, having the vertex regularly and more highly arched, and the occipital region less prominent, rather flatter in fact, than is the case in the Arikaree and Assinaboin crania. No. 457 approaches the peculiar form exhibited in a Pocasset skull, presently to be referred to.

Upon a careful examination of all the cranial specimens of these flat-head tribes of the Columbia River, I find that the distortion is not alike in all. In Nos. 203, 207, 208, 461, 577, 641, 721, 946, 1013, 1014 and 1349 the compression has been so applied as to cause the right half of the occipital region to be more flattened than the left, and, consequently, the antero-posterior diameter of the right side to be shorter than the left. In Nos. 574 and 575 the distortion is just reversed. Nos. 462, 573, 576 and 944 are almost symmetrically flattened, and in such a manner that the coronal region forms a horizontal plane parallel with the basis cranii. In the Kawichien skull, No. 1015, the pressure has been so applied as to give to it the form of a cone or sugar-loaf, causing it thereby to resemble very strongly the strangely deformed Natchez crania, and the Mound Skull, No. 1242, from the ancient town of Chiuchiu, near the Desert of Atacama.

Three crania recorded in the third edition of Dr. Morton's *Catalogue of Skulls*, as belonging to "Cotonay or Blackfoot Indians,"* differ from each other sufficiently to justify the reference of them to two separate groups. While Nos. 744, a male skull, and 745, a female, are decidedly dolichocephalic, No. 1227, the head of a chief named the Bloody-Hand, from the upper Missouri, occupies an intermediate place between the long and short heads. It is a shorter, broader and more elevated or arched cranium. In Nos. 744 and 745 the occipital region exhibits the superiorly inclined or shelving parieto-occipital flatness so characteristic of Swedish and Norwegian crania. The occipital flatness of No. 1227 is less inclined and more vertical. In the length of skull, prominence of occiput, and general shape of the coronal region, No. 744 resembles the cast of a Norwegian skull, No. 1260, which I have in another place already briefly described. The receding forehead, strongly marked supraorbital ridges, and everted upper alveolus of the Kootenay cranium, however, serve to distinguish it from the Norwegian. In general form No. 745 resembles the Arikaree type, as that type or form is displayed in No. 649. No. 1227, in the general outline of the coronal region and flatness of the occiput, resembles the short-headed Germanic and Anglo-Saxon forms. On the other hand, the strongly-marked face, the deep, massive jaw and prominent maxillary alveoli of this skull are striking points of difference. In *Crania Americana*, plate 40, Dr. Morton figures a Kootenay skull loaned to him by Geo. Combe, the celebrated phrenologist. It is decidedly dolichocephalic. Dr. M. has given us no description of this head, but merely alludes to its great interparietal breadth. I am inclined to think that No. 744 is really the cranium from which this plate was drawn. There is not only a close resemblance in the outlines of the two, but in the skull there is a hole in the

* The Kitunaba or Skalsa; Kootenays, Contanics, Aras-en-Flat, or Flat-bows, inhabit the western side of the Rocky Mountains, on the Flat-bow branch of the Columbia River. They are not Blackfeet, and though they hunt on the Missouri, they do not live there.

middle of the right parietal bone, just above the tuberosity, exactly as represented in the plate. A comparison of this plate with the wood-cut of No. 1227, in the *Catalogue of Human Crania*, and also in *Indigenous Races*, is sufficient to show that in this group of three skulls two distinct forms exist. No. 744 may be assigned to the kumbecephalic, and No. 745 to the narrow oval subdivisions of the oval form or type. Both have flat and receding foreheads running up to a higher point at the junction of the sagittal and coronal sutures or just behind this point. No. 1227 falls into the arched type.

To the isolated or unplaced family of the Kitunaha, Coutanies or Kootenays, therefore I provisionally refer Nos. 744 and 745; and to the Satsika or Black-foot branch of the Algonquins, No. 1227.

To the east of the Blackfoot country, and extending from the Saskatchewan River on the north southwardly to the Arkansas River, and from the Mississippi to the Rocky Mountains, lies an important ethnological region occupied by the Dakota and Pawnee Families of Indians. The latter live in two separate localities, surrounded in great part by the more numerous tribes of the former.

Of the Pawnee group the collection of the Academy contains three Arikara, and two Pawnee skulls. The Sioux or Dakota Family is represented by specimens from eight different tribes, viz., Assinaboins, Minetaris, Mandans, Dakotas or Sioux's proper, Upsarookas or Crows, Osages, Ottoes, and the isolated tribe of Winnebagoes living on the western shore of Lake Michigan.

Three female Arikaree skulls from the upper Missouri, (Nos. 649, 949, 748) belong to the dolichocephalic class. The coronal region in No. 649 is oval and rather flat, the vertical diameter, therefore, rather small; the occipital protuberance quite prominent, as in the Cimbric and Swedish crania in the collection, and the upper half of the occipital region flat and shelving like that of the Swedes; the forehead low, superciliary ridges very small, malar bones not very prominent; ossa nasi quite incurvated. The basis cranii of No. 649 exhibits some approach to the kumbecephalic form of Prof. Wilson. No. 949 exhibits the same general characters, but is fuller in the frontal region, and has a less prominent occipital protuberance. The same remarks apply to No. 748. In the homocephalic comparison of the old and new worlds, these Arikaree skulls may be fairly regarded as the American representatives of the Swedish crania.

The two skulls in the collection marked Pawnee are remarkably discrepant in form. One of them, No. 1043, is most probably an Arikaree cranium. The other, No. 540, is a female head from the Platte River. It is figured in *Crania Americana*, plate 38. In this skull the forehead is sufficiently depressed, to cause the posterior part of the head to be higher than the anterior. From the coronal suture, the median longitudinal line, coinciding with the sagittal suture, curves regularly and evenly round to the upper edge of the os occipitis. Hence the posterior region cannot be called flat, although at the first glance it appears so, in consequence of the prominence of the occipital boss. If the line of the crown is continued evenly to the base of the skull, so as to cut off the occipital protuberance, it will then be seen that the posterior region is full and round. This is not the case in No. 1043, also female, which is a longer head with a much more prominent occipital boss. The basis occipitis of this skull is flat, somewhat like that of the Minetaris, while the basis cranii exhibits a long cimbriform outline instead of the round one presented in No. 540. In fact No. 1043 resembles the Arikaree forms in many respects; and should, I think, be classified with this group. It differs from them, however, in such minor particulars as the form of the alveolar arch, breadth of upper maxilla, &c.

To the dolichocephalic group must also be assigned the Minetaris or Gros-ventres of Missouri. The oblong coronal region of the four cranial specimens of this tribe in the collection resembles that of the Arikarees and Assinaboins. The most elevated point of the crown is in the middle of the sagittal

suture, a little anterior to a line drawn through the parietalia from one eminence to the other. The posterior region of the parietalia slopes downwards and backwards to the irregular and lozenge-shaped occipital protuberance. The basal portion of the occipital bone is remarkably flat,—nearly horizontal, in fact,—and the cerebellar fossæ quite shallow. This peculiarity is well-marked in all the specimens composing this group. This feature and the prominent occiput give to the Minetari skull the appearance of being pinched or drawn out behind. This is particularly the case in No. 746. The low crown, flat sides and base of these skulls give them an angular, oblong or box-like appearance. The specimens of this group, three of which are females, and the fourth a male, are remarkably alike.

Three Assinaboin skulls, also from the upper Missouri, (Nos. 659, 1230, 1231) are larger than the Arikarees, as shown by their greater internal capacity. They are more massive and roughly marked, and in general present more of the rude Indian character. They are broader between the parietal bosses than the Arikaree heads; and, consequently, have a less narrow, and somewhat differently shaped coronal region. The contour of the latter slightly approximates the Germanic form. The occiput in No. 659, a male skull, is equally protuberant, more massive and flat in the upper part, and the nasal bones less incurvated than in the Arikarees. These features are not so well marked in Nos. 1230 and 1231. It will thus be seen that No. 659 differs more from the Arikarees than Nos. 1230 and 1231, but the two latter, like the Arikaree specimens, belong to the female sex. Upon the whole, the base is not so long and narrow.

The Mandans of the upper Missouri are a long-headed people. The general form of their skulls resembles very closely that of the Arikarees and Assinaboins. This is very well shown in Nos. 643, 644, 738 and 742; of which the first three are females, and the last a male. In No. 739, a female skull, the occipital protuberance is not so fully developed, but the posterior interparietal diameter is greater. The coronal contour, consequently, undergoes some change. In a male skull, No. 740, the broader coronal region is more oblong than oval. In No. 741, also a male skull, the greater elevation of the bregmatic region gives to that skull the arched or upsicephalic form presently to be described. No. 738 closely resembles the Kootenay skull, No. 745.

No. 204, the skull of a Dakota or Sioux Indian, belongs to the Creek type, as exhibited in No. 1454, though the occiput is a little more prominent, and the head slightly longer and narrower. Its form is transitional from the broad oval of the Assinaboin skull. No. 112, the head of a Dakota child, is markedly dolichocephalic, with an occipital region like a shelving roof. No. 605, the skull of a Dakota or Sioux Indian from Wisconsin, somewhat resembles the Chetimache type, as the reader will perceive at a glance, by comparing plates 19 and 39 of *Crania Americana*. The truncation of the occiput is confined entirely to the upper part of the os occipitis and is but slightly marked. Indeed the posterior region taken as a whole is full and rounded or globular like that of the Pawnee skull, No. 540. These two heads, in fact, resemble each other closely, so that it is difficult to say whether both be Pawnees or both Dakotas. They certainly appear to belong to the same tribe. Dr. Morton speaks of having once seen in Philadelphia, in 1837, twenty-six chiefs and braves of the Sioux nation. "Every man of them," says he, "had a broad face, high cheek bones, the large Roman nose expanded at the nostrils, a wide but low forehead and flat occiput."

The Osages are brachycephalic, as is particularly shown in No. 54, in which the coronal region is almost round like that of the true Germanic head, and the occiput perpendicularly flattened. This skull, which is that of a young warrior named the Buffalo Toil, from Arkansas, is figured by Morton in *Crania Americana*, plate 41. The face is large and rude, the malar bones massive, and the alveoli prominent; but the forehead is less recedent than in many of the Indian crania. The skull belongs to the angularly round or

square-headed Gothic type. No. 650, from the upper Missouri, is an older and longer head, inclining rather to the Swedish form. It is not a Brachycephalus, but occupies a position intermediate between the long and short heads.

The Ottos of the upper Missouri belong partly to that intermediate form which I have designated in the preceding pages as the arched type, and partly to the short-headed groups. The oblong crown in No. 755 is considerably elevated at the junction of the sagittal and coronal sutures. The occipital region is full, broad and round, and not flattened. These skulls all incline to the brachycephalic type. Indeed No. 756, which may be said to represent the Calmuck form, and No. 758, should be classed among the short heads. No. 758, the head of a young child, though longer, has a vertically flat occiput.

The Upsarookas or Crow Indians of the upper Missouri are long-heads. The two skulls of this tribe in the collection are males, and resemble each other very closely. They are long, oval crania; the upper part of the occiput protuberant and lozenge-shaped; the face long, the ossa nasi high, and the depth of the upper alveolus so considerable as to give a peculiar osteological expression to the face not easily described.

Of the Winnebagoes, one, No. 559, is a short, angularly round head; the other, No. 560, is of an oblong form. In No. 559 the slight posterior flatness is confined entirely to the upper part of the os occipitis. In No. 560 the occiput is more protuberant, and the base and crown longer than in No. 559.

Of the great and widely extended Algonquin Family, the Museum of the Academy contains 79 skulls of 21 different tribes. These tribes are the Massasaugas or Missisigees, and the Chippewas of Upper Canada, the Penobscots of Maine, the Mohegans of Connecticut, the Narragansetts and Pocassetts of Rhode Island, the Naumkeags of Massachusetts, the Naticks of Nantucket, the Lenni-Lenapes or Delawares of New Jersey, Pennsylvania, &c.; the Nanticookes of the Wyoming Valley; the Ottawas, Menominees and Pottawatomies of Michigan; the Sauks, Ottigamies and Illinois of Illinois and Wisconsin; the Miamis of Indiana; the Shawnees and Mingos of Ohio; the Shyennes of Missouri, and the Blackfeet.

The Iroquois family is represented in the collection by 13 crania of Mohawks, Oneidas, Senecas, Cayugas and Hurons. The former habitat of these tribes was the country around and between Lakes Huron, Erie and Ontario, in the heart of the Algonquin area. Of the southern Iroquois the collection contains not a single specimen.

The Massasauga cranium, (No. 27,) of upper Canada, is a decidedly dolichocephalic head with a protuberant occiput, a moderately elevated coronal region, and an oval base. In its general form it resembles the Arickaree skulls.

The Penobscot skulls may also be classed with the Dolichocephali. They are narrow and rather long, with a regularly oval crown. The occipital region is rather narrow, but not flat, being smoothly rounded; the elevation of the crown about the middle of the sagittal suture, by increasing the vertical diameter, slightly approximates this skull to the arched type. These remarks particularly apply to No. 89, an Indian of the Gepepscot tribe of Maine. No. 105 is very similar to it, but being fragmentary, and of uncertain locality, it need not further occupy our attention.

A Mohegan or Mohican skull of the Quinipiack tribe, (No. 26), is broad and globular with a rounded occipital region. It occupies a position intermediate between the long and short heads and approaches the Mongol form, as that form is exhibited in the Calmuck, Cossack and Burat crania.

A Pocasset cranium (No. 1036) is comparatively short with a flattened occiput and triangular coronal region. It strongly resembles the Narragansett head, No. 693, and should probably be grouped with this specimen.

The Narragansetts of Rhode Island are dolichocephalic. The ten skulls representing this tribe in the collection are not equally elongated. On the contrary, Nos. 693, (male,) 953, (female,) and 956, (male,) are much

shorter, and may be said almost to belong to the Brachycephali. No. 693, the *fac simile* of the Pocasset skull just referred to, is a peculiar head. The coronal region is irregularly oblong; the head widens out backwards from the os frontis, attaining its greatest width between the parietal centres of ossification. Moreover, the low receding forehead slants upwards to the same interparietal diameter. The broad posterior region slopes downwards to the foramen magnum, as if pressed under the overhanging parietalia. Nos. 950, (female,) 951, (male,) 954, (female,) 957 (male) and 1040, (female,) are oblong heads, having for the most part the superior occipital flattening seen in Swedish crania, and also the protuberant occipital process, which is of the usual size and appearance in Nos. 950 and 954, and forms a very large triangular knob in No. 951, projecting in a straight line beyond the inferior and posterior edges of the parietalia, as in the Swedish skull, No. 1249. In No. 957 the protuberance disappears, or is very much softened down, in consequence of the cone-like manner in which the whole posterior region converges to a blunt point. The basal surface of the occiput is non-symmetrically flattened, the right half being pressed up towards the parietals more than the left. This flattening is probably posthumous. In No. 955 we have another instance of this apparently posthumous deformity. The highest point of the vertex in No. 957 is at the anterior fontanelle. In No. 1040 the protuberance of the occiput overhangs the basal portion like a ridge. In this skull is also exhibited the basal occipital flatness which, as we have just seen, characterizes the Minetari skulls. No. 952 is asymmetrical, the right half being a little shorter than the left. No. 953 belongs to the arched type. A slight flatness is observable in the posterior, inferior part of the parietalia, but the occipital bone curves regularly round to the foramen magnum without any flatness whatever. The same remarks apply to No. 956. Nos. 953 and 957 are remarkably prognathic. In No. 953 the prominence of the maxillæ gives to this skull a negro-like appearance.

A Naumkeag skull (No. 567) from Salem, Massachusetts, is a long, narrow oval head with a projecting occiput, and a high coronal region which is distinctly carinated.

Five Natick skulls from Nantucket, upon the whole, appertain rather to a form intermediate between the Dolicho- and Brachycephali, than to either one of these classes. The elevated vertex and but moderately prominent occiput give to No. 103 the arched form. No. 104 is a longer head, with a flatter crown and a more protuberant occiput. No. 107 is an oblong, dolichocephalic head. In No. 110 the upper part of the hind head is flat, and the protuberance of the occiput lozenge-shaped.

The Natick and Narragansett skulls may be said to represent the woolly-haired African form.

The Lenap or Delaware Indian skulls in the Academy's collection, also fall, for the most part, into the dolichocephalic class. With the exception of Nos. 205, 206 and 1263, they are long, though not strikingly narrow heads. The general outline of the coronal region resembles that of the Arickarees, Assinaboins, Cherokees and Iroquois, — occupying a place in fact between the latter two. The occipital boss, though protuberant, is less so than in the Arickaree, Assinaboin and Cherokee heads. The occipital region is superiorly flattened. The upper jaws are more salient than in the heads already described, amounting in the female skull, No. 40, as shown in *Crania Americana*, plate 32, to negro-like prognathism. No. 1263 may be regarded as a Brachycephalus. In consequence of the posterior, interparietal diameter being greater than the frontal, the contour of the coronal region differs from that of the others of this group, and resembles that shown in some of the German skulls, especially No. 706. The posterior region is broad and perpendicularly flattened. The coronal outline of No. 1265 resembles in some respects that of No. 1263. Nos. 205 and 206 dug up from a street in Philadelphia, and sent to the Academy as Delaware Indians, are very similar in form to Nos. 1263

and 1265. They appear to be very old. The ten specimens composing this whole group appear to belong to a form or type of skull differing in many respects from those to which most of the heads already alluded to belong. Nos. 40 and 115 are narrow ovals; Nos. 118 and 418 may be classed in the same group, but they approach the arched type by being higher. They are, indeed, transitional in form to Nos. 1264 and 1265, which are still more elevated in the coronal region. The form again changes in No. 1263, which is shorter, has a triangular crown and a flatter and broader occiput, and is arranged therefore among the short heads with vertical occiputs.

The Nanticoke head (No. 1219) is a broad, low skull, with a full rounded occiput. It resembles somewhat, No. 26, the Quinipiack or Mohegan cranium.

The form of the Mingo skull (No. 455) is a long oval, with a broadly oval crown and base, and a prominent occiput.

The Ottawas of Michigan may be partly referred to the arched type. No. 1007 is brachycephalic. It is a broad, low and round head. A greater prominence of the occipital boss in Nos. 1006, 1008 and 1009, causes these three skulls to depart somewhat from this type and approach the Swedish form. I have consequently placed them in the dolichocephalic division.

The cranial specimens of the Menominees of Michigan, in the collection, differ from each other in their general configuration not a little. No. 35, the cranium of a female, resembles the Pocasset skull above referred to,—a skull the principal characters of which are a recedent forehead, a relatively broad posterior, interparietal diameter, and a flatly-rounded occiput. No. 563, also a female head, resembles No. 35, but is rather less recedent in the forehead, has a broader base, and a fuller and broader occipital region. No. 78, a male skull, is a long head, with protuberant occiput, the protuberance flattened vertically, and the lower and posterior parts of the parietalia flattened like an inclined plane. The median longitudinal line of the crown, in consequence of the more expanded forehead, approaches an oval figure. A fuller forehead, less prominent occiput and higher bregmatic region gives to No. 44, (a female head,) the arched form. The contour of the coronal region of No. 1220 is a broad, rounded oval. The posterior region is full and rounded. In No. 1222, a Menominee chief, the crown is a longer oval, the line of the sagittal suture more arched, and the occipital protuberance well pronounced. No. 454, figured by Morton in *Crania Americana*, is a short, round and asymmetrical head, with a fuller frontal region and a less flat occiput than we find in the others. It has a Germanic crown.

Two male Chippewa or Ojibway skulls in the collection (Nos. 683, 684,) belong to the Dolichocephali. In the general form of the calvaria they resemble Swedish crania. They differ from the latter, however, in other respects, particularly in the face, which, singularly enough, in its osteological expression is very like the face of the Chinese skull. In this respect No. 684 (Chippewa) resembles No. 94 (Chinese) not a little.

Among the Miamis of Indiana we again encounter the dolichocephalic type. No. 542, the skull of a chief, (plate 30 of *Crania Americana*) is in many respects like the German heads in the collection, especially those from Tübingen, Frankfurt, Berlin, &c. It is less full in the forehead, and more prominent about the middle of the sagittal suture. It has the Swedish occiput. In the whole series, except Nos. 541, 1055, 1058 and 1233, the outline of the crown forms a more or less rounded oval. In No. 1056, a female skull, this outline approaches the angular Gothic form, which is still better displayed in Nos. 1058, a young child, and 1233 also a female head, and is characterized by a disproportionate breadth between the parietal protuberances. No. 541 is a narrow, oblong head. No. 106 approaches the arched type. In all the specimens the forehead is quite well developed; and in most of them the upper part of the occiput is slightly flattened. In Nos. 1058 and 1233 the flatness is nearly vertical.

In the two Illinois skulls the occipital region is wanting. No. 1010 evidently

belongs to the mesocephalic form. No. 1051* is a Mound skull. It was found in 1848, in a tumulus on the Blue River, Illinois. Enough of the parietals has been preserved to show that the posterior region was flattened and that the head should be placed among the Mesocephali.

The Ottigamies or Fox Indians, of Illinois and Wisconsin, belong to the short-heads. Nos. 639 and 694, both male skulls, strongly resemble the angularly round or square form. The outline of the coronal region is nearly a rounded square. The occiput is almost vertically flat. No. 209 differs from these two in having a less wide occiput. No. 415, a half breed, is a long head with a retreating forehead, a broad crown and the Swedish form of occiput.

The Potawatomes of Michigan are Dolichocephali. No. 657 (plate 34 of *Cranio Americana*) is a rude, massive, male skull, "remarkable," as Dr. Morton has observed, "for its capacity behind the ears, and for the great length and flatness of the coronal region." The apparent flatness of the crown is in part due to the angular prominence of the parietal bones at the anterior third of the sagittal suture. The forehead is low; the posterior region large, broad and angular, with no very decided or marked flatness. In No. 737, a male skull, the crown is broader in proportion to its length than in No. 657, and less flat; the posterior region round and full. The parietal bones at the anterior portion of the sagittal suture are less prominent than in No. 657. No. 1322, a young Potawatome warrior, varies from the others in being narrower and having a somewhat more prominent occipitis. The face reminds me of the Chinese physiognomy.

No. 736, the cranium of a young child, is brachycephalic, with a flat occiput and bulging parietalia.

The Sac or Sauk Indians may be called long-heads. In No. 561 the crown is oblong; the highest point at the junction of the coronal and sagittal sutures. The upper part of the occiput is irregularly lozenge-shaped and prominent, the basal portion rather flat. No. 1246 is a rudely carved and massive head, almost vertically flattened behind. The lower part has somewhat the appearance of being pressed underneath towards the foramen magnum.

Two of the three skulls in the collection, marked Shawnee, are dolichocephalic, the other is brachycephalic. They are of uncertain history and locality, however, and cannot be relied upon as genuine representatives of this tribe. No. 606 is a long, narrow, oval head, resembling the Pawnee and Arickaree forms. No. 691, a remarkably inequilateral skull, belongs to a very different form. The whole head is broader, and the posterior region flattened almost entirely to the right of the median line. No. 1210, like No. 606, is a long, narrow head; the median, longitudinal line of the crown slightly carinated after the fashion of the Eskimau skulls. The posterior region is broader and more protuberant than in No. 606, while the elevation of the vertex causes the skull to approximate the arched form.

A Shyenne skull, (No. 1041), from Fort Williams, Arkansas river, belongs to the arched form. The superior alveolus is prominent, while the back of the head shelves downwards and backwards like an inclined plane. This cranium resembles the Chippeway (No. 684) and Blackfoot (No. 1227) heads. No. 939, also a Shyenne, from the neighborhood of Fort Kearney, differs somewhat from the preceding. It is less highly arched, the occipital region is less prominent, and the crown more triangular and broader between the parietal protuberances.

The Iroquois skulls in the collection are Dolichocephali. They may be classed very appropriately with the Cherokees. No. 16, exhumed near Lake Erie, closely resembles No. 632. The occipital region is flattened superiorly. No. 989 is probably not an Iroquois skull, though so marked. Its form differs very much from the others. These three crania, though grouped with the oval forms, occupy in reality an intermediate place between the oval and arched types.

* Erroneously numbered 1042 in the Catalogue.

Of three Mohawk skulls exhumed near Manheim, in New York, two are long-heads, (Nos. 895, 896), and one (No. 897) is intermediate in form between the long and short-headed groups. They may be said to belong to the arched form. They are shorter, broader and rounder in the base than the Cherokees, Arickarees, Assinaboins, Minetaris, Iroquois, &c., but less round than the Creeks, Chetimaches, &c. The posterior region is full, and the occipital protuberance though well developed, is not so prominent a feature as in some of the long heads.

The Oneida skull (No. 33) exhibits the arched form. It is a long, narrow head with a long, narrow face and small cheek bones.

The Seneca cranium (No. 1516) belongs to a peculiar variety of the same general form, but is broader, and has fuller frontal and occipital regions, and a broader base. Both it and the Oneida are long heads. Occipital region rather flat.

The skull of Wan-yün-ta, a Cayuga Chief, (No. 417), is a very long, narrow, oval head, somewhat kumbecephalic, with a prominent occipital protuberance.

The Huron crania belong partly to the Brachycephali, and partly to the Mesocephali. No. 15, the head of a Huron Chief, killed near Detroit, is a massive, strongly marked and brutish skull. The forehead is flat and receding; the superciliary ridges very prominent; superior maxilla everted; lower jaw ponderous and flared out at the angles after the manner of the typical Eskimau skull; malar bones projecting; ossa nasi much incurvated; junction of parietal bones ridged or keel-like; skull rather narrow; occipital protuberance pretty well marked; anterior bregmatic region elevated, giving an arched outline to the whole head; occipital flatness in the upper part of the posterior region. In its general configuration, as viewed laterally, it resembles the Creek and Chetimache skulls, but differs from them in greater elevation of crown. This coronal elevation is shown also in the other three skulls in this group, (Nos. 607, a female, from Cleveland, Ohio, 1217 and 1218, also female, from Detroit), which all exhibit this arched form, except No. 1217, which is nearly round. They are all short heads. Nos. 607 and 1218 have the Swedish form of occiput; the shelving, however, is not well marked, and the occipital protuberance not very prominent. In No. 1217 the occiput is flattened both above and below the protuberance. The whole posterior region is here broad and flat.

Thirty-five crania from eight different tribes have been contributed to the collection from the States of Louisiana, Mississippi, Alabama, Georgia, Florida and the Southern part of Tennessee; or, in other words, from that section of the United States comprised between the Cumberland River and the Gulf of Mexico, and the Savannah and Sabine rivers. These tribes are the Cherokees, Muscogees or Creeks, Yamassees, Seminoles, Uches, Choctaws, Natchez and Chetimaches.

There are six Cherokee skulls in the collection. Of these two, (Nos. 632, 634) belonged to women, and two (Nos. 633, 635) to young girls, while two ancient crania from the mounds in South Carolina (Nos. 1285, 1297) are males.

No. 632, found "in a cave at Springtown, Polk Co., Tennessee, north of the river Hiwassee, and near an ancient battle-ground," is a beautifully formed female head, *ætat* 20 years. It is regularly and symmetrically oval. The forehead, though low, rises evenly and gradually from the nasal suture up towards the coronal region, which region slopes away as gradually and is lost in the flattened and shelving upper half of the occiput, below which appears the regularly and smoothly protuberant occipital prominence. The head is a long, narrow oval, and belongs to the Dolichocephali. The base is long and narrow, the face small, and the nasal bones moderately prominent, with a rather sharp line of junction. It is a better formed head than the Assinaboin and Arickaree skulls. The Arickaree approaches it more nearly than the Assinaboin. No. 633, a Cherokee girl, *ætat* 14 years, which was found with the preceding, has the same general characters, but is not so regularly oval

in contour. The nasal bones are flatter, and the superior maxillary more prominent. The latter bone, singularly enough, somewhat resembles that of a Japanese skull in the collection. The rest of the head is, however, very different. In No. 634, a woman, at 20, the receding forehead rises much less regularly and more abruptly towards the vertex. The posterior region as a whole is fuller and rounder, in consequence of the protuberance of the occipital bone being less prominent, and the shelving and flattening of the upper part not so great. The base is fuller posteriorly and less narrow than that of No. 632, approaching in this and some other respects the two Mound heads, presently to be noticed. No. 633 may, in fact, be regarded as intermediate in form and characters between these Mound heads and No. 632. In the characters just mentioned, the two Mound heads (Nos. 1285, 1297) exhibit some difference. The whole head is larger, has a higher internal capacity, and is very roughly marked, the prominences and depressions being particularly well developed. The coronal region is oblong instead of being oval, the forehead flatter, the super-iliary ridges strongly displayed, the nasal bones small and incurved, the alveolar margin of the superior maxillary prominent even to prognathism, malar bones heavy, protuberant and rough; occipital region flatly protuberant, the flatness not being confined to the upper part, but ascribable to the whole occipital region, a feature mainly due to the greater prominence of the superior and anterior portion of the ossa parietalia, the diminished inclination of the posterior part of these bones, and the flat surface presented by the occipital protuberance. The base behind the meati is very broad, the mastoid processes large and heavy, and the lower jaw massive and deep at the symphysis. Still these heads are Dolichocephali.

The crania of the Creek nation exhibit the same peculiar type to which the Chetumache skull belongs, and of which it may be regarded as the standard. No. 441 (Creek warrior from Alabama) is brachycephalic. No. 579, the skull of Athlaha-Ficksa, a full-blood Creek Chief, is somewhat longer, flatter on the top, and less round. Concerning this head, Dr. Morton thus writes: "The broad but low forehead, and the width between the parietal bones, are highly characteristic in this head: a front view is given of it, in order to convey an accurate idea of the osteology of the Indian face.* Thus we see the large and projecting cheek-bones, an arched and prominent bridge of the nose, powerfully developed jaws and remarkably perfect teeth. The distance between the eyes is even greater than is usual, yet the orbits themselves are not large in proportion." No. 751, a Creek woman of Georgia, is a long, oval head with a protuberant occipital boss, and a superiorly flattened occipital region, approximating in some respects the Kimbrioid skulls in the collection. In No. 1454, a Creek Indian skull of Western Arkansas, the type again varies. The occipital region as a whole is greatly protuberant, yet this prominence is gradually lost in the median line of the crown. In an equally gradual manner the forehead and the sides blend with the coronal region, the most elevated point of which is in the anterior part of the sagittal suture.

The specimens in the collection constituting the Seminole group vary not a little from each other. Some are long, and others short. No. 456 (plate 24 of *Crania Americana*) is a round, high, almost globular head, peaked at the junction of the coronal and sagittal sutures. No. 604 (plate 22 of *Crania Americana*) is a longer head, whose full length I find, upon examination, is not fairly shown in the first wood-cut on page 166 of *Crania Americana*. For the head is more symmetrical, the flatness of the posterior region being more decided on the left than on the right side. It is from the shortened side that the wood-cut is taken. The increased length of the head appears to be mainly due to the very protuberant os occipitis. The crown is less elevated than in the preceding skull. No. 698 is a moderately long and oval head and is more highly

* See *Crania Americana*, plate 26, for a facial view, and the figures on p. 170, for lateral, coronal and posterior views of this skull.

arched. A slight prominence of the sagittal suture is observed about one inch posterior to the coronal. No. 707 is a shorter skull, and has a full, high forehead, a regularly arched crown, and an occiput full and rounded. No. 708 resembles 698, as do also Nos. 727, 729, 730, 732, 733, 753,* 1105 and 1286. All these are long, oval-shaped heads, with a more or less narrow and prominent occiput, and the coronal region regularly arched antero-posteriorly except in No. 730, in which it is flatter. Nos. 726, 728 and 754 are not quite so long; the occipital region is also broader and less prominent. All the above specimens are from different parts of Florida. It will thus be seen that in this group there are at least two if not three distinct types: a short, high form, to which Nos. 456 and 604 belong, and a long and more or less oval form, which includes all the others.

The three ancient Yemassee skulls, from a mound near Tampa, in Florida, in which they appear to have lain upwards of a century, are all long, narrow and high skulls, belonging to what I call the arched type. They may, in fact, be taken as the standard of this type. In Nos. 1214 and 1215 the outline of the crown is oval; in No. 1216 the oval outline is interrupted by the greater breadth between the parietal tubers.

Two Chetimache skulls, (Nos. 43, 70), one male and the other female, belong to the brachycephalic class. They were exhumed from a cemetery in the Parish of St. Mary, in Louisiana, and were considered by Morton as genuine skulls of the Chetimache tribe. They are angularly round heads, with a recedent forehead, elevated vertex, perpendicularly flattened occiput, and striking breadth between the parietal bosses or ossific centres. The form of these crania is, in many respects, peculiar. It belongs, as far as the general contour goes, to the great short-headed class, in which are arranged the Germans, Finns, Laplanders, Kalmucks, Slavonians and Turks. But from each and all of these it differs in several respects. The outline of the coronal region resembles a truncated spherical triangle, the base of which coincides with the post-ror bipolar diameter. In this respect these heads resemble some of the German crania in the collection. But the latter differ from the former, in the relation which the longitudinal diameter bears to the vertical. In the general globularity of the posterior region, and the proximity of the foramen magnum to the back of the head, the Chetimache cranium resembles the Finnic, Slavonic and Turkish types, but differs from them in the more recedent and proportionately less broad forehead, which latter feature makes the vertex appear more prominent. Of No. 70, the larger of the two heads under consideration, the reader will find in *Crania Americana*, an excellent lithograph, (plate 19.) together with the following observation from the pen of Dr. Morton:—"The nearly vertical occiput, the great height of the skull, and the size and strength of the bones of the face, are not surpassed by those of any Indian cranium I have seen," (p. 163.)

The young female Choctaw skull (No. 22) is a large, oval, high head with a prominent occiput.

The Euchee cranium (No. 39) is a comparatively short head, with a full, rounded occipital region. In its general form it resembles the Slavic skull.

The collection embraces 26 miscellaneous crania obtained from the mounds in Michigan, Illinois, Wisconsin, Ohio, Tennessee and Florida.

No. 416 is an Indian skull taken from a mound seated on the high bluff which overlooks the Mississippi river, one hundred and fifty miles above the mouth of the Missouri. Morton describes it as "a large cranium, very full in its vertical diameter, and broad between the parietal bones."† It is a good example of what I am disposed to call the arched type. It is dolichocephalic. In its general arched form it resembles the Creek skull, No. 1454. The coronal region closely resembles that exhibited by the Cherokee skull, (No. 634),

* Erroneously numbered 1556 in the printed Catalogue.

† See *Crania Americana*, p. 221.

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already described. There is a difference, however, in the basis cranii, No. 416 having a much greater intermastoid diameter.

No. 1237 is the skull of an Indian woman exhumed near Fort Chartres, Illinois. It is brachycephalic and closely resembles the Chetimache skull, No. 43. The two skulls undoubtedly belong to the same great type. Their calvarial outlines are very much alike; though No. 1237 has a somewhat fuller and less recedent forehead. They have the same shaped orbits and anterior nares, the same small and incurvated ossa nasi, and the same prominence of the superior alveolus. In No. 1237 the bony palate is narrower, and the superciliary ridges are more strongly marked. The bases cranium are alike.

No. 1315, the skull of an aboriginal American female, found in a saltpetre cave at Golconda, Illinois, belongs to the arched type. It may be ranked with the Dolichocephali. It has a decidedly prognathous, superior alveolus.

No. 1510, male Indian skull taken from an ancient mound in Illinois, belongs to the same type as the Pocasset cranium already referred to. It is a longer and much older head than No. 1315; is more rudely formed, and has the face projecting further forward, in consequence of the prognathic upper jaw.

No. 1511, an Indian cranium found with the preceding, belongs to the same type, but is not so long, and has a flatter and more recedent forehead, and a broader and somewhat shorter face.

On p. 235 of *Crania Americana*, Dr. Morton informs us, that "in the month of May, 1835, a cavern cemetery was discovered on the bank of the Ohio river, opposite to Steubenville. * * * The bones contained therein appear to have been deposited at different periods of time, those on the top being alone in good preservation. They were of all ages, and thrown in indiscriminately after the removal of the flesh; for it is well known that some tribes were accustomed to gather, at times, all the bones of their deceased relatives, and place them in a common receptacle. Of the great number of skulls found in this place but few were perfect; of which last I have received eight. These heads are thoroughly characteristic of the race to which they pertain. They bear no evidence of great age, and no doubt belonged to individuals of the barbarous tribes. Some have thought them Mingoes, who were affiliated to the Iroquois; but the form of the head does not support this surmise. * * * All these skulls are surprisingly alike—the vertex elevated, the occiput flat, the parietal diameter very great, and the lower jaw massive. They are also of singularly large capacity, and in this respect approach nearer to the Sauks and Foxes, and the Muskogees, than to any other tribes that have come under my notice. The mean internal capacity gives upwards of 85 cubic inches, and the facial angle rises 78 degrees. The anterior chamber gives 38.3 cubic inches, the posterior 49.2; but notwithstanding the proportion of the former, there can be little doubt that these skulls belong to the savage tribes, and not to the Toltec stock."

Of the above skulls, Nos. 420, 436, 437, 438, 658 and 723 resemble each other very closely. They are all, with the exception of No. 438, asymmetrical. This want of symmetry is due to a remarkable flattening of the occipital region, on the left side in Nos. 436 and 437, and on the right in Nos. 420, 658 and 723. There is, consequently, a striking want of correspondence between the antero-posterior or longitudinal diameters of the two sides in each skull. Nos. 438 and 724 are flatter in the crown, and have, therefore, a shorter vertical diameter. All the specimens of this group may be assigned to the same cranial type as exhibited in the Chetimache skull, No. 43. In the Mound skulls, however, the calvarial region is flatter, and has therefore less of the arched form than the Chetimache crania. The occipital region in the former is also broader and flatter. There are facial differences likewise. Nos. 439 and 210 are longer, narrower, more oval and without the occipital flatness. They present nothing of the arched form. In No. 723 the narrowness of the os frontis, the wall-like flatness of the occipital region, and the lowness of the crown combine to produce a singularly triangular form.

No. 53, from a mound at Circleville, Ohio, is a long-head. In general form it is like the Blackfoot cranium No. 1227, but has a more prominent occiput.

No. 1287, from a mound at Chillicothe, Ohio, very closely resembles the Pocasset skull, from which it differs by being somewhat broader. It occupies a position intermediate between the long and short heads. No. 1288, found in the same mound, is a long boat-shaped head with a very protuberant occipital boss.

No. 1512, from a mound in the Scioto Valley, Ohio, is a brachycephalic skull. Of this cranium Dr. Morton thus wrote: "This is, perhaps, the most admirably-formed head of the American race hitherto discovered. It possesses the national characteristics in perfection, as seen in the elevated vertex, flattened occiput, great interparietal diameter, ponderous bony structure, salient nose, large jaws and broad face. It is the perfect type of Indian conformation, to which the skulls of all the tribes from Cape Horn to Canada more or less approximate. Similar forms are common in the Peruvian tombs and have the occiput, as in this instance, so flattened and vertical as to give the idea of artificial compression; yet this is only an exaggeration of the natural form, caused by the pressure of the *cradleboard* in common use among the American nations."

No. 992, from a mound in Tennessee, resembles No. 1512. It is asymmetrically flattened. It is a short head, with a flat wall-like occiput and a triangular crown. The forehead and whole crown, indeed, are narrower than in No. 1512. It is just such a form as we might suppose the Pocasset type would take if pressed behind.

No. 1271, from a mound near Huron river, Ohio, is a short head with an almost vertically flat occiput. No. 1272, found with the preceding, is a longer and more oval head, with a more rounded occipital region.

No. 1270, from Detroit, is a long, narrow, oval head, resembling, in general form, the Arikaree skulls.

No. 1455, from a mound in Florida, is artificially flattened in such a manner as to resemble somewhat the Chinook or Charib skulls.

No. 212, the cast of a Kenhawha skull, is a short head with a vertical occiput.

No. 1557, from the banks of the Susquehanna river, is a long, oval head with prominent parietal and occipital protuberances.

No. 215, from South Carolina, is brachycephalic. It belongs to the globular, Mongolic form. No. 216 is a long head, as are also Nos. 218 and 219.

No. 134 is a long, narrow, oval and high head, with a prominent occiput. Nos. 136 and 146, from Warren county, Pennsylvania, are both dolichocephalic.

No. 135, found on the brow of a hill about two miles below Trenton, New Jersey, is a long, asymmetrical head. It is probably the skull of a Delaware Indian. The supraorbital ridges are more prominent, however, than in the specimens of the Delaware group. This feature is also exhibited in the fragment, No. 249, found in the same locality.

The collection contains four Californian skulls. No. 1514 is the cranium of a California Indian, from a mound near Sacramento City. It is a dolichocephalic head; long and flat; the forehead narrow and low. The calvaria widens out posteriorly to the parietal tubers; the most elevated part of the vertex is on a line coinciding with the greatest interparietal diameter. The posterior part of the parietal bones shelves down to the prominent upper part of the os occipitis. The base is long and oval. The face of this skull is wanting.

No. 1565 is a fragmentary Indian skull, thickly encrusted with carbonate of lime. It was found in a cave in Vallecita, Calaveras Co., California, along with 306 other human crania, all embedded in limestone. It has the same general appearance and conformation as the preceding skull. The occiput is, however, more prominent, and the contour of the more angular crown approaches a lozenge-shaped oval. The calcareous incrustation extends, in some places, to the depth of an eighth of an inch.

In the south-western part of the North American continent lies an extensive tract of country designated by Prichard, Latham and other systematic ethnologists as the Paduca area. This ethnological region extends, according to Latham, from the Pacific ocean, in a south-eastwardly direction, to the Gulf of Mexico; from the water-system of the river Columbia to that of the Sabine river, and from north of 45° N. L., to south of 25° S. L. It is occupied by numerous, imperfectly known and unclassified tribes to whom the term Paduca has been applied provisionally. The tribes of this group represented in the collection are the Shoshonis or Diggers, Utahs, Moquis, Apaches, Navajos, Lipans, Camanches, and that race of people which, though seemingly now extinct, once formed the numerous population of the large towns, long since in ruins, such as Quivira, Abo, Guarra, Pecos, &c.

The Shoshoni, or Root-Digger skulls, three in number, vary in form. No. 1446, obtained on the Trucky river, in the California mountains, belongs to a peculiar form or type of which examples have already been pointed out in the Pocasset, Narragansett and other tribes. It is, however, a broader skull. The crown approaches the triangular form; the forehead is rather broad and flat. The whole crown rises up to a sort of eminence situated between the parietal bosses. The occipital region is broad and rather flat, the basis cranii broad and rounded. Nos. 1447 and 1449 are long heads. They differ in the form of the crown, which in No. 1449 is a long, regular oval, but in No. 1447 is flat and broad posteriorly between the parietal tubers. No. 1449 resembles somewhat the Arickaree form in both the occipital region and the basis cranii. No. 1447, in consequence of a greater projection of the occiput, exhibits the supero-occipital flatness of the Swedish form.

Of this group Dr. Morton thus wrote: "Two of these skulls are so small, so receding in the forehead, and so depressed over the whole coronal region, that they could not, by intrinsic evidence alone, have been identified with any branch of the aboriginal American race. They want the vertical occiput and general rounded form of the Indian head, and have a narrowness of the face unusual with these people."*

No. 1448, from the Eastern slope of the Sierra Nevada, and recorded in the catalogue as pertaining to none of the Shoshoni tribes, is a large, massive, heavy head, rudely developed. In the median line the crown runs back to an elevation similar to that seen in the Potawatomie skull (No. 657) figured by Morton; from this prominence descends a broad and almost perpendicularly flat occipital region. Hence, when viewed in profile, the skull has a quadrangular appearance. This ponderous head, which Dr. Morton termed "the very type of Indian conformation," differs decidedly from Nos. 1447 and 1449, and resembles No. 1446.

In November, 1855, Dr. Thomas J. Turner, while at Mare Island, California, dug up two skulls which he supposed to be those of Digger Indians. They were buried under a mass of calcined shells, some seven feet below the surface. One of these crania, No. 1027, is that of a female in all probability, and is the *fac-simile* of the Shoshoni skull No. 1449. It is a long, narrow head with an oval occiput. The other skull, No. 943, is a long, high head, differing considerably from No. 1027 and all the specimens grouped in the catalogue as Shoshonees. Nos. 1446 and 1448 should evidently be classed together as belonging to one tribe, while Nos. 1447, 1449 and 1027 clearly belong to another group.

The skull of a young Utah girl (No. 140) is dolichocephalic, with prominent occipital and parietal protuberances, and a rhomboidal crown.

Two Moqui crania, Nos. 138 and 139, are small, non-symmetrical heads. Both have the posterior region flattened; the one slightly, the other decidedly. No. 138 exhibits the shelving, parieto-occipital flatness; the other, No. 139, has the back of the head almost vertically flattened. No. 139 is brachycephalic;

the other may be said to be mesocephalic. In No. 138 the occipital protuberance is well marked; in No. 139 this protuberance is nearly obliterated.

Three crania from Quivira and Quarra, New Mexico, (Nos. 1032, 1033 and 1034), are brachycephalic. The occiput in all is more or less flattened, but most decidedly in No. 1032.

A Pueblo cranium (No. 930) is dolichocephalic with shelving occipital flatness. Another Pueblo skull (No. 937) is short, high, and non-symmetrical.

A skull from Santa Fe (No. 931) is a short, asymmetrical and occipitally flattened head.

No. 1346, the skull probably of an ancient tribe of Lipan Indians, from the celebrated sepulchral cavern of Bolson de Massimi, between San Sebastian and San Lorenzo, in the State of Durango, New Mexico, is a long, oval head with a very prominent occiput. No. 1345, the cranium of a modern Lipan, is shorter and has a somewhat more rounded occiput.

The skull of a very young Apache child (No. 141) is dolichocephalic, and in its general form very much like the Utah cranium, No. 140. No. 145, the skull of a Mescalero Apache Indian, from the Desert of Black Hills, Texas, recently added to the collection, is a long oval and very symmetrically formed head, with protuberant occipital and parietal protuberances. It also resembles No. 140. No. 1035, the skull of a Mescalero Chief, is an oblong, barrel-shaped head with a rounded occiput and broad base. No. 935, a Mogoyon Apache, is a long, high head, very broad between the mastoid processes. No. 936, the cranium of a Navajo Indian, is a long, ponderous, broadly oval head with a broad base, a broad, high and almost vertical forehead, and a flattened posterior region. In its general form it resembles somewhat Nos. 1446 and 1448 of the Shoshoni group.

No. 247 is the skull of a Comanche Indian, supposed to be that of "Yellow Wolf," head chief of his nation. It was found in a very conspicuous tomb, in a large Indian burial ground, on the head-waters of the Colorado River, near the deserted Fort Phantom Hill, Texas. It is a dolichocephalic cranium, of the arched type.

No. 34, a Mexican Indian from Acapancingo, eighteen leagues south of Mexico, and referred by Morton to the Tlahuica tribe, is a dolichocephalic, prognathic female skull.

No. 734, a male skull exhumed near the Indian village of Guahapan, on the mountain Popocatepetl, is mesocephalic and broadly oval. No. 735, a female skull found with the preceding, is a long head of the arched type. These two crania were regarded by Dr. Morton as probable examples of the ancient Aztec nation.

Three skulls from an ancient cemetery at Otumba differ in form; Nos. 714, a male, and 716, a female, are dolichocephalic. The first, however, forms a broad oval, while the second belongs to the arched type. No. 715 is brachycephalic and globular.

Nos. 717, 718 and 720 are ancient Mexican crania from Tacuba. The first belongs to the arched, the second to the cubical, and the third to the broadly oval type. The first two have pyramidal faces. No. 718 is brachycephalic and carinated also. Nos. 717 and 720 are dolichocephalic.

The Otomie skulls are, for the most part, dolichocephalic. No. 1323, the cranium of Vicente Rivaz, an Otomie Cazique of the pure Mexican race, is a narrow oval in form. No. 1001 is arched. No. 1002 is phoxocephalic, with a very protuberant occiput.

No. 1004, the skull of an ancient Mexican of the Tlascalan nation, is brachycephalic and globular.

No. 1005, a woman of the Chechemecan nation is mesocephalic and arched. No. 681, a Mexican woman of the Pames tribe, is intermediate between the long and short heads, and is phoxocephalic. Another female skull of the same tribe, No. 1313, is a broadly oval dolichocephalus.

No. 1314, exhumed from an ancient cemetery at Cerro de Quesilas, near the

city of Mexico, and regarded by Dr. Morton as a relic of the genuine Toltec stock, is a mesocephalic, male skull, with a broad and flat vertex. It resembles somewhat the Maya cranium referred to below.

Nos. 682, 234, 1353 and 1566 are brachycephalic and cubical. No. 1515, a modern Mexican Indian cranium, is intermediate in length and phoxocephalic.

Nos. 1347, 555, 557, 558 and 689 are dolichocephalic and broadly oval. No. 556 is also dolichocephalic, but belongs to the arched type. It has a mamillated occipital protuberance.

The skull of a Maya Indian of Yucatan, No. 990, is dolichocephalic, and broadly oval, with a very flat crown and prognathic jaws.

The Araucanian female crania, Nos. 651 and 652, are long, broadly oval heads. The sides and occipital region being slightly flattened and not rounded, give a certain angularity or squareness to these heads,—a feature which is more marked in another female skull of this group, No. 654, on account of the very flat vertex. No. 655, a male cranium, is a longer oval, with a somewhat more prominent occipital region. No. 656, a female skull, resembles somewhat the form exhibited by the Pocasset head. No. 935, also a female, has a higher vertex, and is more protuberant in the upper half of the occipital bone. No. 997, a male skull, exhibits the arched type. Nos. 221 and 222 are arched like the Yamassee skulls.

The only unflattened Charib skull in the collection, No. 692, is a long, moderately high and broadly oval skull. No. 638 and a cast, No. 225, though compressed or flattened heads, evidently belong to the Dolichocephali.

The Brazilian crania are all dolichocephalic. The Tapuyo skull, No. 1254, is a large, long and broadly oval cranium. Three other Brazilians, Nos. 1513, 1528 and 1529 are long, oval heads more or less prominent behind. The Guaycuru skull No. 1530 is also long and oval in form, with a prominent occiput. Nos. 1555 and 1556, two Gentoo skulls from the Purus River, a tributary of the Amazon, are small, oval dolichocephalic crania.

The collection contains a cast of the skull of a Patagonian, and another of the head of a Puelche girl. The former, No. 1357, (of which No. 226 is a duplicate), is large, long and cylindrical or barrel shaped in form. The latter, No. 1359, is a high, short and broad head with a flat, occipital region.

Of the 245 Peruvian crania belonging to the Academy's collection, 50 are dolichocephalic and 168 brachycephalic; while the remaining 27 fall into the mesocephalic or intermediate class rather than into either of these two extremes. To the elongated or dolichocephalic form belong all the specimens from Arica enumerated on pages 76, 77 and 78 of my *Catalogue of Human Crania*, together with nine others from the same locality, added to the collection since the publication of the catalogue. These skulls are artificially distorted, and are referable to one or another of the grotesque forms exhibited in plates 2, 3, 4 and 5 of the *Crania Americana*. The Arica skull, No. 932, is brachycephalic. To the long-headed class belong also the following, viz: Nos. 415, 1048, 1417 and 1445, from Pisco; No. 231, from Lima; No. 11, an ancient Chimuyan, from Truxillo; No. 637, a Quichua of upper Peru; No. 1517, a child from Payta; No. 232, from Atacama; the casts (Nos. 700, 701, 702, 703, 704, 705, 710 and 711) of ancient Peruvian crania from Titicaca, Coracocha, Pomeié and Chimgaue; and Nos. 940, 941 and 942 from the ruins of old Callao. In Nos. 1048, 1417 and 231, we again meet with examples of the narrow, oval form or type; in Nos. 1445, 11, 232, 940 and 942, of the broad oval; and in Nos. 637, 1517 and 941, of the upsicephalic or arched form.

Ninety-three skulls from Pachacamac are Brachycephali; eleven others, Nos. 402, 409, 571, 631, 696, 1453, 1457, 1462, 1467, 1489 and 1499, are mesocephalic. Of these latter, Nos. 571, 631, 696, and 1499, may be referred to the arched form. Had the process of growth and development not been interfered with in No. 76 by artificial means, this skull would have been a broadly oval Dolichocephalus. In the brachycephalic group must also be arranged all

the crania from Pisco, except three—Nos. 445, 1048 and 1445—which are dolichocephali; and four—Nos. 1061, 1326, 1369 and 1423—which are mesocephali and all referrible to the arched form. Another series of Peruvian crania, collected at Paracas Bay by Dr. Turner, (Nos. 1298, 1273, 1274, 1275, 1303, 1304, 1305, 1025 and 1026, none of which are recorded in my printed *Catalogue*), belong likewise to the Mesocephali and to the phoxocephalic group of the arched form or type. All the skulls from Santa are brachycephalic, as are also all from Lima, except No. 231, which is a long-head, and No. 68, which is a broadly oval mesocephalus. No. 451 is also mesocephalic and arched. Nos. 1518, from Payta, 1046 from Guamay, 447, 448 and 233 from Callao are brachycephalic.

From the above statements it will be seen that among the Peruvian crania in the Academy's collection the Brachycephali are greatly in numerical excess over the long and middling long-heads. As regards their type or ethnic form they may all be placed in the kubicephalic or square-headed group.

As a summary of the more prominent facts recorded in the preceding pages, and in order to exhibit as distinctly as possible the leading differential characters of the American Indian crania contained in the museum of the Academy, I have constructed the following tables, and attempted therein to classify these crania according to their length as compared with their height and breadth, and according to their general ethnic forms or types. Grouping them in this manner is essentially preliminary to comparing them with corresponding groups of skulls of the old world. Such a comparison I purpose to institute in a future monograph to be devoted to the consideration of the large collection of Esquimaux skulls referred to above.

In the first table the American races represented in the collection are grouped in accordance, for the most part, with the philological arrangement or classification of Latham, while their crania are arranged in dolichocephalic mesocephalic and brachycephalic classes. In the second table these skulls are classified with especial reference to the more prominent of the ethnic or typical forms exhibited by the entire series. This classification must not be regarded, however, as rigidly accurate. It is provisional only, as all such classifications must necessarily be, and subject, therefore, to future revision. Large as is the collection of American skulls now under consideration, it is, nevertheless, exceedingly defective. With the exception of the Peruvians and, next to these, the Seminoles and Esquimaux, the specimens representing the different tribes are but few in number, and of the identity of some of these I am not yet perfectly satisfied; moreover there are many well-known tribes and races of which the collection contains not a single cranial specimen. Though the collection is not sufficiently diversified to exhibit all the probable cranial forms of the aboriginal Americans, it is ample enough to show that among these people there are long, short and intermediate heads divisible into pyramidal, oval, cylindrical, arched, wedge shaped, flat, globular, cubical, prognathic and other forms, all as different from each other as are the distinct types of the old world. In assigning the skulls to these typical groups or classes I have experienced the usual difficulty in locating the transitional or aberrant forms, which are always, in large collections, more or less numerous, and which often effectually obliterate all sharply-drawn lines of demarcation. Future examinations and comparison may cause these transitional specimens to be transferred from groups in which I have at present placed them to others; but this transposition though it may ultimately lead to the establishment of other types, can in no case diminish the stability of those which I have just indicated. These groups, by means of the intermediate forms, graduate into or blend with each other, and we are thus admonished here, as in other departments of natural history, of nature's eternal enigma of a certain undefinable, serial unity pervading and co-ordinating an endless diversity of forms.

Table I. *Classification of Aboriginal American Crania according to length.*

I. DOLICHOCEPHALI.	II. MESOCEPHALI.	III. BRACHYCEPHALI.
Long skulls more or less oval; with more or less protuberant occiputs.	Skulls intermediate in length, with broadly oval, triangular or quadrangular crowns; the occiput generally rounded or rather flat.	Short skulls with rounded base, and globular, or more or less vertically flattened occiputs.
	<i>A. Esquimaux Group.</i>	
Esquimaux, Nos. 1558, 1559, 1560, 1561, 1562, 1563, 674, 675, 676, 677, 678, 679, 200.		
	<i>B. Athapascan Group.</i>	
Chimseyan, No. 987. Naas, Nos. 213, 214. Chinooks (?), Nos. 457, 578.	<i>C. North-western Group.</i>	Tlatskanai, No. 577.
		Nisqually, No. 208. Suquamish, Nos. 944, 946, 1013, 1014. Kawichin, No. 1015. Kowalitsk, No. 573. Killemoock, No. 576. Klikatats, Nos. 207, 461. Kalapuya, No. 574. Chinooks, Nos. 462, 641, 721, 1349, 1350. Klatsops, Nos. 203, 575.
Kootenays, Nos. 744, 745.	<i>D. Kootenay Group.</i>	
	<i>E. Pawnee Group.</i>	
Pawnee, No. 1043. Arikaras, Nos. 649, 748, 949.	Pawnee, No. 540.	
	<i>F. Dakota Group.</i>	
Minetaris, Nos. 650, 746, 747, 749. Assinaboins, Nos. 659, 1230, 1231. Mandans, Nos. 643, 644, 738, 739, 740, 741, 742. Dacotas or Sioux, Nos. 204, 112.	Dacota, No. 605. Osage, No. 660. Ottoes, Nos. 755, 757.	Osage, No. 54. Ottoes, Nos. 756, 758.
Aubsarokes, Nos. 1228, 1229. Winnebago, No. 560.		Winnebago, No. 559.
	<i>G. Algonkin Group.</i>	
Massasauga, No. 27. Penobscots, Nos. 89, 105.	Quinnipiak Mohegan, No. 26. Pocasset, No. 1036.	
Narragansetts, Nos. 950, 951, 952, 954, 955, 957, 1040.	Narragansetts, Nos. 693, 953, 656.	

Naumkeag, No. 567.	Naticks, Nos. 103, 401.	
Naticks, Nos. 104, 107, 110.		
Lenni-Lenapés or Delaware, Nos. 40, 115, 118, 418, 1264, 1285, 135, 136, 146.	Lenni-Lenapé, No. 998.	Lenni-Lenapés, Nos. 205, 206, 1263.
Nanticoke, No. 1219.		
Mingo, No. 455.		
Ottawas, Nos. 1008, 1009.	Ottawa, No. 1006.	Ottawa, No. 1007.
Menominees, Nos. 44, 78, 1220, 1222.	Menominees, Nos. 35, 454.	Menominee, No. 563.
Chippewas, Nos. 683, 684.		
Miamis, Nos. 106, 407, 541, 542, 1052, 1053, 1054, 1055, 1056, 1057.	Miamis, Nos. 1058, 1233.	
Ottigamie, (half-breed,) No. 415.	Illinois, No. 1010.	Ottigamies, Nos. 209, 639, 694.
Pottawotomies, Nos. 657, 737, 1322.		Pottawotomie, No. 736.
Sauks, Nos. 561, 1246.		
Shawnees, Nos. 606, 1210.		Shawnee, No. 691.
Shyennes, Nos. 939, 1041.	Blackfoot, No. 1227.	
	<i>H. Iroquois Group.</i>	
Iroquois, Nos. 16, 119, 989.		
Mohawks, Nos. 895, 896.	Mohawk, No. 897.	
Oneida, No. 33.		
Seneca, No. 1516.		
Cayuga, No. 417.		
Huron, No. 607.	Hurons, Nos. 15, 1218.	Huron, No. 1217.
	<i>I. Cherokee Group.</i>	
Cherokees, Nos. 632, 633, 634, 635, 1285, 1297.		
	<i>J. Choctaw Group.</i>	
Choctaw, No. 22.		
Creeks, Nos. 751, 1454.	Creek, No. 579.	Creek, No. 441.
Seminole, Nos. 698, 707, 708, 727, 729, 730, 732, 733, 753, 754, 1105, 1286.	Seminole, Nos. 604, 726, 728.	Seminole, No. 456.
	<i>K. Unclassified Group.</i>	
	Yamassees, Nos. 1214, 1215, 1216.	
	Euchee, No. 39.	Chetimaches, Nos. 43, 70.
		Natchez, Nos. 102, 1106.
	<i>L. Paduca Group.</i>	
Shoshonees, Nos. 1447, 1449, 943, 1027.	Shoshonees, Nos. 1446, 1448.	
Utah, No. 140.		
Pueblo, No. 930.	Moqui, No. 138.	Moqui, No. 139.
		Pueblo, No. 937.

Of unknown origin.

Table II. *Classification of Aboriginal American Crania according to their Ethnic Forms.*

A. PYRAMIDAL OR PYRAMICEPHALIC* FORM.

General Characters. Dolichocephalic; calvaria carinated and pyramidal; face lozenge-shaped and broadest below the orbits.

Esquimaux, Nos. 1558, 1559, 1560, 1561, 1562, 1563, 674, 675, 676, 677, 678, 679, 200.

B. OVAL OR ŌIDOCEPHALIC† FORM.

General Characters. Chiefly dolichocephalic; vertex and base of the skull more or less oval in outline. This oval generally regular, sometimes rhomboidal or angular; sometimes long and narrow, sometimes rather short and broad. Occipital region more or less full and prominent; occasionally very much elongated. Occipital protuberance sometimes knob-like, sometimes acuminate. Posterior portion of the ossa parietalia shelving downwards and backwards like an inclined plane; a portion of this plane sometimes formed by the upper half of the occipital bone. Forehead moderately well developed in breadth and height.

Subdivisions. 1. ~~K~~mbrecephalic or boat-shaped form, in which the occiput is exceedingly protuberant. 2. Narrow oval form. 3. Broad oval form. 4. Barrel-shaped or cylindrical form. 5. Angularly oblong form. 6. Artificially elongated form.

I. ~~K~~mbrecephalic Form.

Arickaree, No. 49.

Cherokee, No. 632.

Miamis, Nos. 1052, 1053, 1054, 1055, 541.

Kootenay, No. 744.

Lenni-Lenapé, No. 40.

Mandan, No. 738.

Seminole, No. 733.

Minetaris, Nos. 650, 746.

Creek, No. 751.

Dakota, No. 112.

Pawnee, No. 1043.

Cayuga, No. 417.

Narragansett, No. 951.

Mound skull, No. 1288.

II. *Narrow Oval Form. (Stenocephalic.)*‡

Arickarees, Nos. 748, 949.

Mandans, Nos. 643, 644.

Cherokees, Nos. 633, 634, 635.

Kootenay, No. 745.

Naas, No. 214.

Lenni-Lenapés, Nos. 115, 118, 418, 1264, 1265.

§ { Miamis, Nos. 1056, 1057.

§ { Iroquois, Nos. 16, 119, 989.

Minetaris, Nos. 747, 749.

Narragansetts, Nos. 950, 952, 954, 955.

Chocta, No. 22.

Lipan, No. 1346.

Peruvians from Pisco, Nos. 1048, 1417.

Peruvian from Lima, No. 231.

Gentoos, No. 1555, 1556.

Penobscot, No. 105.

Seminole, Nos. 727, 729, 730.

Shawnee, No. 606.

Massasauga, No. 27.

Upsarookas, Nos. 1228, 1229.

Illinois, No. 1010.

Mowhawks, Nos. 895, 896.

Natick, No. 107.

Shoshones, Nos. 943, 1027, 1449.

From the Mounds, No. 1270.

Miscellaneous, Nos. 134, 218, 219, 1557.

* Πυραμικός, Κεφαλή.

† Ὀν, Εἶδος, Κεφαλή.

‡ Στενός, Κεφαλή.

§ These five crania form the transition to the arched form.

III. Broad Oval Form. (Eurycephalic).*

Assinaboins, Nos. 659, 1230, 1231.
 Naas, No. 213.
 Mandans, Nos. 739, 740, 742.
 Menominees, Nos. 78, 1220, 1222.
 Miami, No. 407.
 Pottawotomie, No. 737.
 Winnebago, No. 560.
 Chinook, (normal form,) No. 578.
 Chimaseyan, No. 987.
 Creek, No. 579. Shorter and more broadly oval than the Assinaboins, between which and the brachycephalic Creek skull, No. 441, it forms the transition.
 Ottoo, No. 757.
 Ottawa, No. 1008.
 Seminoles, Nos. 754, 708.
 Utah, No. 140.
 Pueblo, No. 930.
 Apaches, Nos. 141, 145.
 Lipan, No. 1345.
 Peruvian from Pisco, No. 1445.

Chimuyan, No. 11.
 Peruvian from Atacames, No. 232.
 Peruvians from Callao, Nos. 940, 942.
 Peruvian from Lima, No. 68.
 Naticks, Nos. 104, 401.
 Sauks, Nos. 561, 1246.
 Mingo, No. 455.
 Dakota, No. 204. Departure from Assinaboins. Stands between it and the Creek skull, No. 1454.
 Ottigamie, (half breed,) No. 415.
 Shyenno, No. 939.
 Eucsee, No. 39.
 Californians, Nos. 1514, 1565.
 Miscellaneous, No. 216.
 Maya, No. 990.
 Tapuro, No. 1254.
 Guaycuru, No. 1530.
 Charibs, Nos. 638, 692.
 Araucanians, Nos. 651, 652, 654, 655.
 Brazilians, Nos. 1513, 1528, 1529.

IV. Barrel-shaped or Cylindrical Form. (Kylindricephalic).†

Patagouian, No. 1357.
 Narragansett, No. 1040.

Apache, No. 1035.

V. Angularly Oblong Form.

Shoshone, No. 1447.

Natick, No. 107.

VI. Artificially Elongated Form.

Peruvians from Arica, 29 crania.

Peruvians from Titicaca, Corocolla, &c., 8 casts.

C. ARCHED OR OPSICEPHALIC‡ FORM.

General Characters. Generally dolichocephalic; high or vertically elevated skulls. Forehead high; vertex or coronal region sometimes curving from the glabella to the occipital protuberance, so as to form a more or less regular arch, as in the *Archencephali*; sometimes running up to an elevated point at the junction of the coronal and sagittal sutures as in the *Phoxocephali*.

I. *Archencephali*.§

Seminoles, Nos. 707, 726, 1286.
 Shoshone, No. 1448.
 Seneca, No. 1516.
 Pottawotomies, Nos. 657, 1322.
 Oneida, No. 33.
 Cherokees, Nos. 1285, 1297.
 Chippewas, Nos. 683, 684.
 Blackfoot, No. 1227.
 Shawnee, No. 1210.
 Huron, No. 607.
 Ottawa, No. 1009.
 Naumkeag, No. 567.
 Moqui, No. 138.
 New Mexico, No. 1033.

Menominee, No. 44.
 Osage, No. 660.
 Penobscot, No. 89.
 Mounds, Nos. 416, 1315, 210, 439, 1272, 53.
 Minsi (Lenapé), No. 998.
 Narragansett, No. 953.
 Araucanians, Nos. 221, 222, 995, 997.
 Yamassee, Nos. 1214, 1215.
 Quichua, No. 637.
 Peruvian of Payta, No. 1517.
 Peruvian of Callao, No. 941.
 Peruvians from Pisco, Nos. 1061, 1326, 1369, 1423.

* Ευρυς, Κεφαλή.

† Κυλινδρικός, Κεφαλή.

‡ Ὑψίς, Κεφαλή.

§ Ἀρχή Κεφαλή.

II. *Phozocephali*.*

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|---|--|
| Seminoles, Nos. 604, 698, 732, 753, 1105. | Narragansetts, Nos. 956, 957. |
| Hurons, Nos. 15, 1218. | Naticks, Nos. 103, 110. |
| Shyenne, No. 1041. | Comanche, No. 247. |
| Mandan, No. 741. | Peruvians from Pachacamac, Nos. 571, 631, 696, 1499. |
| Ottoo, No. 755. | Peruvians from Paraccas Bay, Nos. 1298, 1273, 1274, 1275, 1303, 1304, 1305, 1025 and 1026. |
| Ottawa, No. 1006. | |
| Creek, No. 1454. | |

D. WEDGE-SHAPED OR SPHENOCEPHALIC† FORM.

General Characters. Chiefly mesocephalic or intermediate in length between the dolichocephali and brachycephali. Forehead more or less recedent; crown triangular in shape, narrow at the forehead and wide between the parietal protuberances. Back of the head more or less flat, and pressed in towards the foramen magnum. Constitutes the transition to the square-headed brachycephali.

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|------------------------|---|
| Pocasset, No. 1036. | Araucanian, No. 656. |
| Menominee, No. 35. | Mound crania, Nos. 1510, 1511, 1287. |
| Narragansett, No. 693. | Chinook (normal form,) No. 457, approaches this type. |
| Shoshone, No. 1446. | |
| Yamasee, No. 1216. | |

E. FLAT OR PLATYCEPHALIC FORM. (*Subglobular*.)

General Characters. Chiefly mesocephalic like the preceding group, with flat vertex, and rounded occiput. Transitional to the round-headed or globular brachycephali.

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|------------------|--------------------------|
| Pawnee, No. 540. | Seminole, No. 728. |
| Dacota, No. 605. | Miamis, Nos. 1058, 1233. |
| Mohawk, No. 897. | |

F. GLOBULAR OR SPHARICEPHALIC‡ FORM.

General Characters. Brachycephalic; vertex, occipital region and base rounded or globular. Occiput sometimes rather flat.

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|--------------------------------|-------------------------------------|
| Ottawa, No. 1007. | Ottoo, No. 756. |
| Ottigamie, Nos. 639, 694, 209. | Mohegan, No. 26. } Transition from |
| Pottawotomie, No. 736. | Nanticoke, No. 1219. } broad ovals. |
| Winnebago, No. 559. | Seminole, No. 456. Transition from |
| Missouri, No. 211. | arched form. |
| Menominee, No. 563. | Huron, No. 1217. |
| Mound, No. 420. | Moqui, No. 139. |
| Miscellaneous, No. 215. | New Mexico, No. 1034. |

G. SQUARE, CUBOIDAL OR KUBICEPHALIC§ FORM.

General Characters. Brachycephalic. Occiput vertically flattened, or nearly so.

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| Chetimaches, Nos. 43, 70. | New Mexico, No. 1032. |
| Creek, No. 441. | Pueblo, No. 937. |
| Lenni-Lenapés, Nos. 205, 206, 1265. | Santa Fe, No. 931. |
| Osage, No. 54. | Peruvians from Pachacamac, 93 crania. |
| Ottoo, No. 758. | Peruvians from Pisco, 55 crania. |
| Shawnee, No. 691. | Peruvians from Santa, 8 crania. |
| Kenhawha, No. 212. | Peruvians from Lima, 5 crania. |
| Puelche, No. 1359. | Peruvians from Payta, Guamay and |
| Mounds, Nos. 436, 437, 438, 658, 723, 992, 1237, 1271, 1512. | Callao, Nos. 1518, 1046, 447, 448 and 233. |

* Φοζος, Κεφαλή.

† Σφην, Κεφαλή,

‡ Σφαίρικος, Κεφαλή.

§ Κυβικός, Κεφαλή.

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